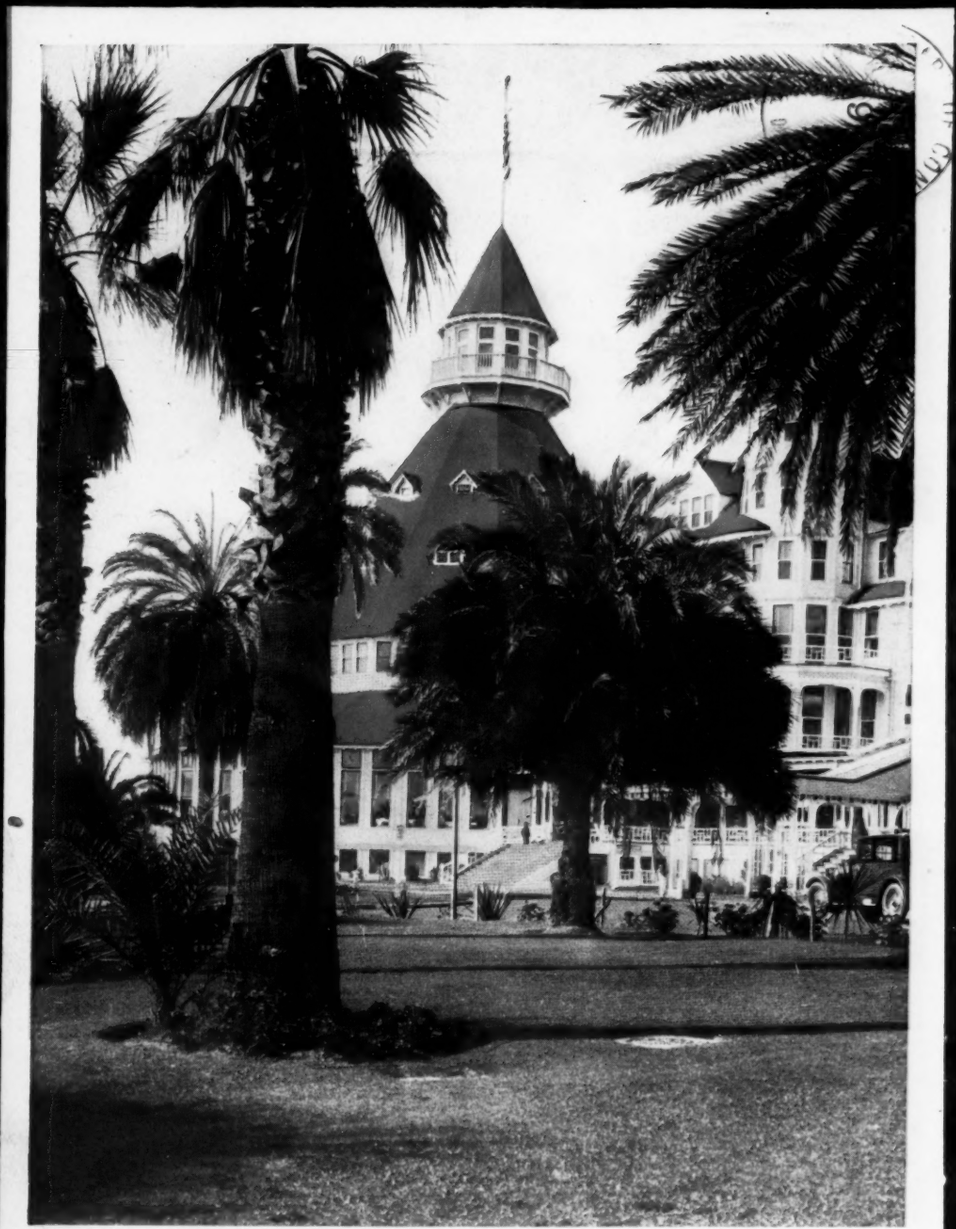
WESTERN GAS

August
1928



Hotel del Coronado, Coronado Beach, California—where members of the Pacific Coast Gas Association will meet in Thirty-fifth Annual Convention, September 17-20

20 Cents
the Copy

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

MERCO

TRADE MARK

Type R

Nordstrom Valves

This Valve is of the plug cock type, embodying our patented "Sealdport" type of lubrication which prevents leaking and sticking. Being economical in cost it is especially recommended for Curb and Meter service. "Sealdport" lubrication makes a positive seal around the plug when Valve is either open or closed. The plug can be turned 360° and can be relubricated while in any position.

Especially Recommended for Curb & Meter Service

Turning of the lubricant screw applies pressure to the lubricant which jacks up the plug. The plug is held on its seat by means of a metallic spring disc at the base of the plug. Recommended for services where air or water pressures do not exceed 100 lbs. or where gas or gasoline pressure do not exceed 50 lbs. Ask for Catalog.

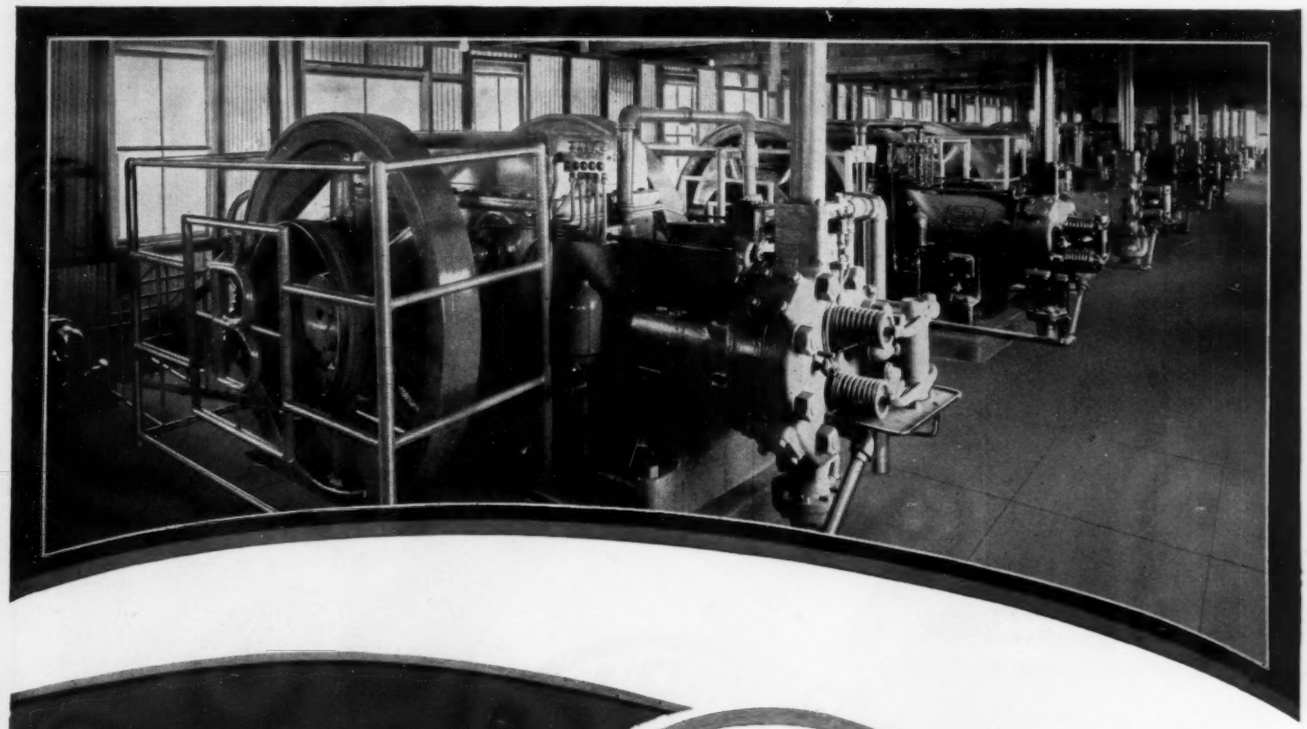
MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY

Engineers—Manufacturers

Boston: 184 Boylston St.
Chicago: Peoples Gas Bldg.
Dallas: Magnolia Bldg.
New York City: 11 W. 42d St.
New Orleans: Masonic Temple Bldg.
San Francisco: 121 Second St.
Cleveland: Engineers Bldg.
Houston: Petroleum Bldg.
Los Angeles: Union Bank Bldg.

Factories: Oakland, Calif., and Belleville, N. J. Agencies in principal cities.



The photograph shows Barnsdall Oil Company's installation near Seninole, Oklahoma, which contains ten of the new Cooper Type 16, 50 H.P. gas engines direct driving compressors. This station was put into operation last year.

Ten of the New Cooper Type-16

This is one of the installations which has been demonstrating the merits of the new Cooper Type-16, 50 H. P. compressor units since last year. This is Cooper's response to the demand for a real good small compressor unit which could be used for boosting small quantities of gas or for small gasoline or air and gas lift plants. It is a four-cycle engine with still better fuel economy. A new method of direct driving the compressor cylinders results in a short compact unit requiring less space. It was the first engine of its size to use Timken main bearings. By changing the power liner and piston and replacing the magneto with an oil pump it can be converted to a full Diesel engine in the field. Any branch office can give you complete information.

The
C. & G. Cooper Company

Mount Vernon, Ohio
Kennedy Building, Tulsa — Magnolia Bldg., Dallas
649 S. Olive St.
Los Angeles

August, 1928, Volume IV, Number 8. WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.

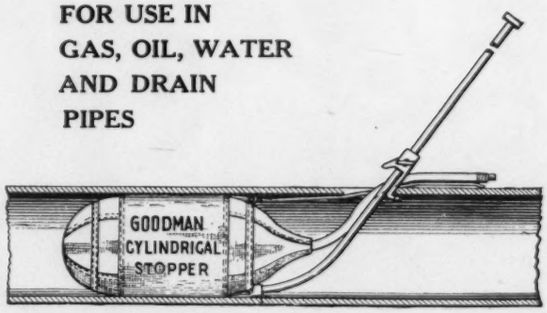
Street Department Supplies

Gas Main Bags

THREE TYPES

TYPE A—Seamless.
TYPE B—Reinforced Seams
TYPE C—Canvas Covered

FOR USE IN
GAS, OIL, WATER
AND DRAIN
PIPES



Air Line Mask

With or without Blower.

Mask and Blower in separate cases.

Blower will supply sufficient air for 4 masks.

If you have not received your copy of our new catalogue, please let us know.

Safety Gas Main Soap Tape

For bandaging broken pipe. Also binding tape to cover soap tape bandage.

Sample on request.

Safety Gas Main Stopper Co.

523 Atlantic Avenue, BROOKLYN, N. Y.

New England Representative
The Eastern Service Co., Boston, Mass.

Texas-Louisiana Representative
Maintenance Engineering Corp.
Box 1402, Houston, Texas

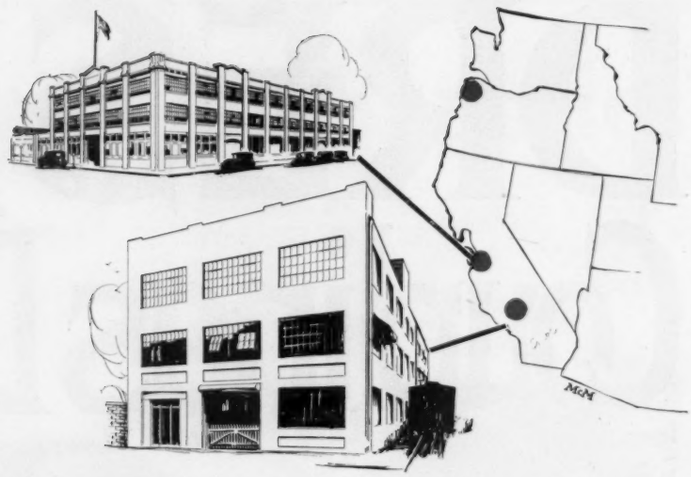
Pacific Coast Representative
C. B. Babcock Co., San Francisco, Calif.

Mid-Western Representative Circle Corporation Tulsa, Oklahoma

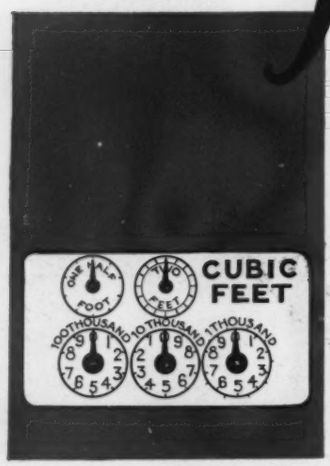
DRESSER
Couplings Dominate

Dresser Couplings are strong, flexible and durable. When equipped with indestructible Lead Tipped Gaskets, they are ideal for manufactured gas mains, as they will remain permanently tight.

S. R. Dresser Mfg. Co.
Bradford, Penna.



Performance in Service Confirms Their Value



MECHANICAL ASSETS OF PACIFIC METERS ARE INSURED BY WIDE FACILITIES—EXPERIENCED LABOR—AND THOROUGH INSPECTION IN EVERY STAGE OF MANUFACTURE.

1—Adjustable Tangents.

2—Double Acting Clicks.

3—Channels and Valve Port Construction.

4—Clearance Between Diaphragms and Casing.

5—Bottom—Solid—Leak Proof.

6—Top Cover and Flange Construction.

7—Bridge Plate and Carriage Design and Construction.

8—Durability of Valve Seat and Valve Cover.

9—Diaphragms—exclusive American Meter Company quality, fabrication methods and impregnation formulas.

10—Casing constructed of finest quality Tinned Steel manufactured to specification.

These and other features of Pacific Meters conform to a definite manufacturing policy of specialization in Pacific Coast requirements

Known Factors in Accurate and Productive Meter Service

PACIFIC METER WORKS

Specializing in the Manufacture of Gas Meters and Allied Apparatus for Pacific Coast Requirements

San Francisco Established 1901 Los Angeles

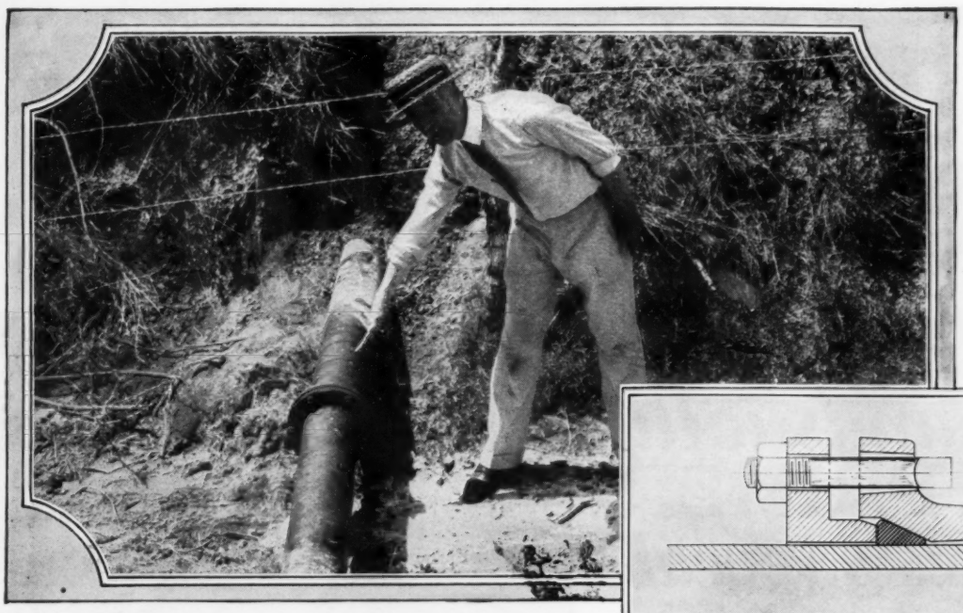
Portland

AMERICAN METER CO MEASUREMENT ENGINEERS CUBIC FEET

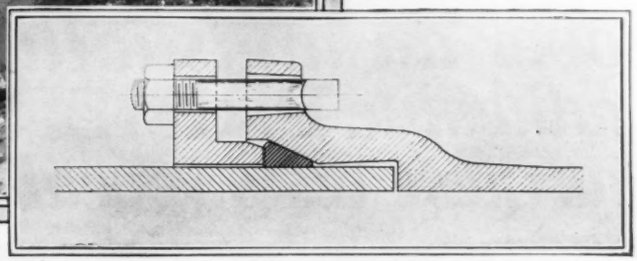
Northwestern Representatives

Northwest Gas and Electric Company

AMERICAN METER CO MEASUREMENT ENGINEERS CUBIC FEET



The Anthony joint is easily and quickly set up. It requires no special tools, no protective coating and it lasts indefinitely. Anthony joint pipe can be furnished in 24-foot lengths made up of two standard lengths welded and tested under ideal conditions at our plant.



"The life of the coupling itself is, of course, the main point". . . . . *(Report of a Gas Company to Sub-Committee on Pipe Joints—A.G.A. Convention 1927)*

THE report quoted above goes on to say, "This has led to our viewing the Anthony joint of the U. S. Cast Iron Pipe & Foundry Co. with much interest as this joint gets away from most of this doubt." Since this statement, another year of experience is back of the Anthony joint. Additional facts are available. While it is still too soon to claim that deLavaud pipe with the Anthony joint has overcome every high-pressure gas transmission problem, this much can be said:

So far, the Anthony joint has demonstrated (1) *unusual flexibility,* (2) *freedom from leaks under service pressures as high as 90 to 125 lbs.,* (3) *resistance to vibration,* (4) *freedom from corrosion.* And, of course, it has all of the age-defying quality of cast iron, plus low cost installation.

We will be pleased to furnish the latest facts on installations of deLavaud pipe and any further data which you may desire to have on file regarding this important development in gas transmission.

United States Cast Iron Pipe and Foundry Company

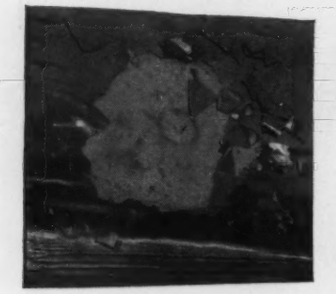
General Offices:
Burlington, New Jersey

Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 957 East Ferry Street
Cleveland: 1150 East 26th Street
New York: 71 Broadway

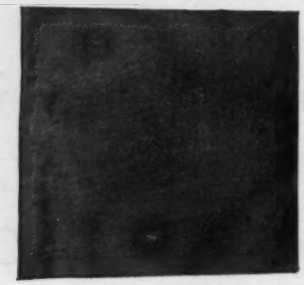
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
Dallas: Akard & Commerce Sts.
Kansas City: 13th & Locust Sts.
Minneapolis: 6th Street & Hennepin Avenue

BITURINE enamel

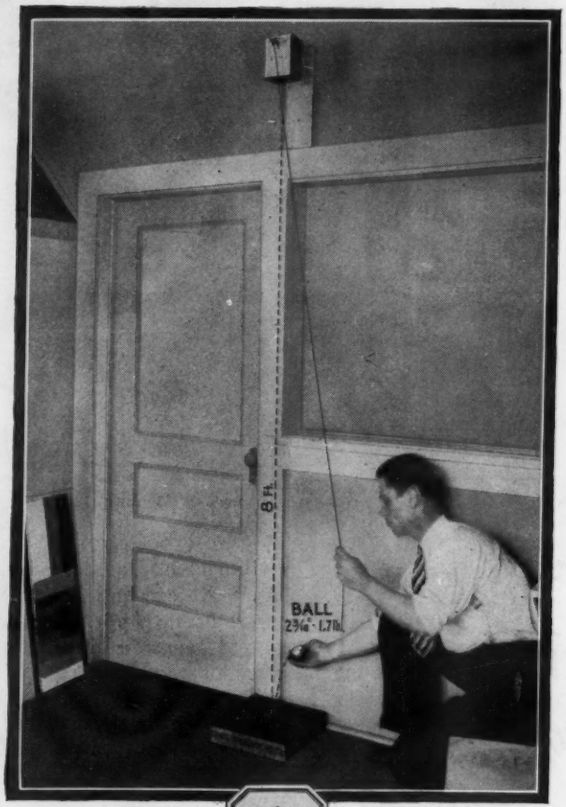
Is applied ~ over an unusually adhesive PRIMER as these tests reveal~



The plate above shows the result of dropping a 2 3/16" diameter steel ball, weighing 1.7 pounds, upon ordinary coating from a height of eight feet. Note how the coating has cracked, finally chipping off when again struck on the under side, leaving the surface of the metal exposed.

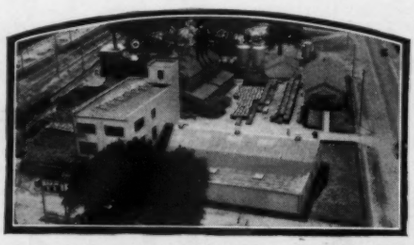


Above is the plate coated with Biturine Enamel and Biturine Primer after the test. Note absence of cracked surfaces; even when this plate was turned over and again struck with the steel ball, the primer adhered tightly to the metal. No bare surfaces were left exposed.



A pipe line coating is protective only as long as its primer binds it tenaciously to the surface. If the priming coat scales off, the enamel coating, of course, comes off with it, leaving the line exposed to destructive corrosion. Biturine Enamel in addition to being a heavy, quick-setting bituminous coating itself, is applied hot over an adhesive primer that adds years of service to the life of ordinary pipe line coatings.

Following the method used by the U. S. Navy for testing bituminous coatings, samples of coatings, including Biturine, were tested recently in our laboratory. The result showed that Biturine adhered tightly to the metal, (see illustration of test at right) and that it passed the test with a considerable margin of strength and adhesiveness above that required by the Navy for its bituminous coatings. Biturine Enamel can be broken on occasion, but **not** at junction of primer and enamel; primer adheres tightly to metal and bonds the enamel.



View of Tulsa Branch Factory where Biturine Enamel is made.

Biturine Enamel permanently protects against corrosion. It is waterproof, and unaffected by acids, soil alkalis and electrolysis. On thousands of miles of pipe Biturine has been used successfully to eliminate corrosion. In use over sixteen years by leading pipe line operators.

HILL, HUBBELL & COMPANY

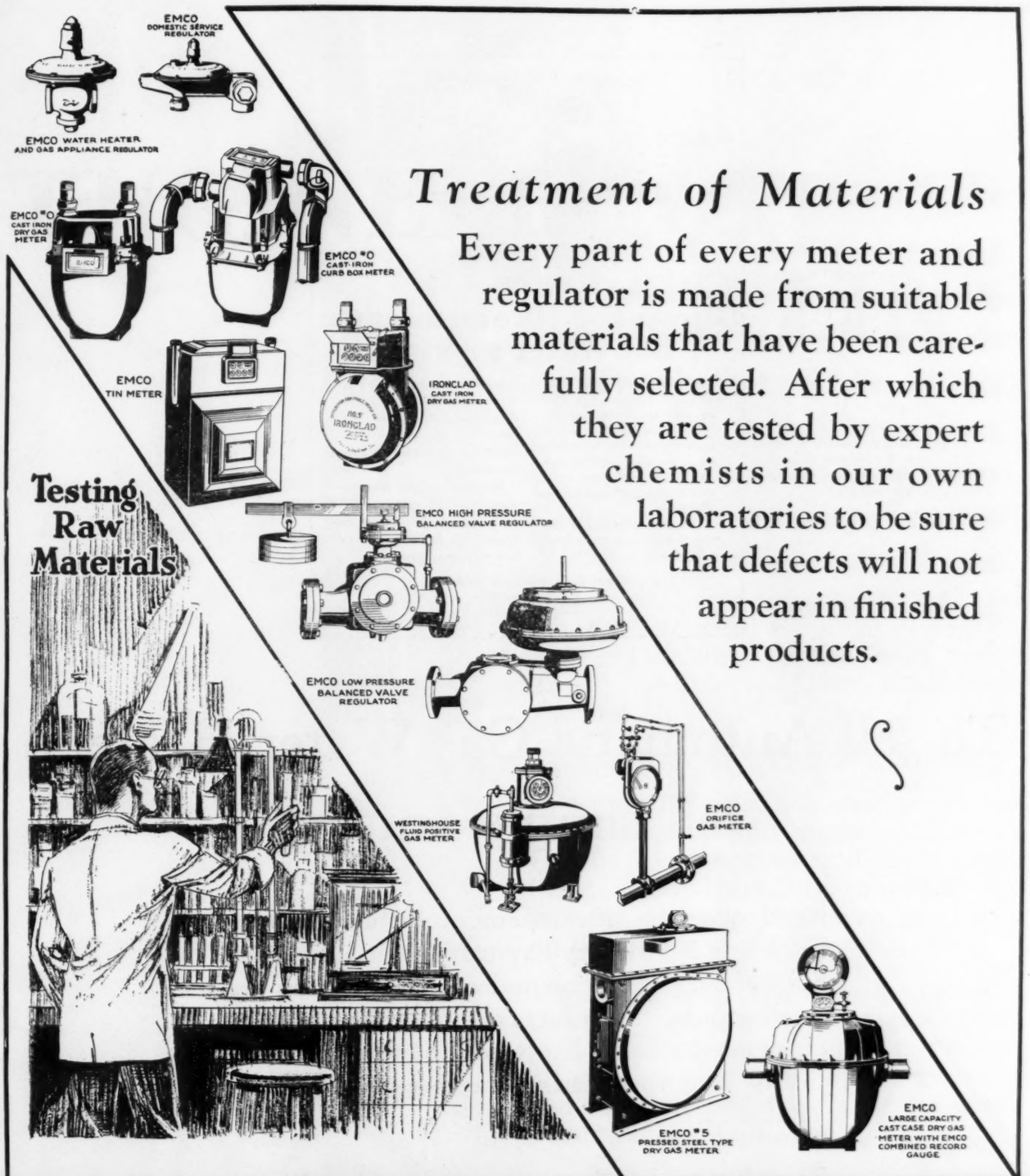
Manufacturers of

Highest Grade Oil Industry Paints and Pipe Line Coatings

Factories SAN FRANCISCO and TULSA

Offices

SAN FRANCISCO LOS ANGELES PORTLAND SEATTLE TULSA HOUSTON NEW YORK BALTIMORE



Testing Raw Materials

Treatment of Materials

Every part of every meter and regulator is made from suitable materials that have been carefully selected. After which they are tested by expert chemists in our own laboratories to be sure that defects will not appear in finished products.

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS TULSA SEATTLE KANSAS CITY SALT LAKE CITY

Guests too, like automatic hot water service

One never knows when hot water is wanted in their home. And one never knows who wants it.

On the average, there is a demand for hot water 70 times a day in the usual family of four. And this demand starts in the early morning and continues until late at night.

How inconvenient it is to meet that demand with the ordinary water heater!

But a modern Automatic Gas Water Heater keeps hot water always ready for instant use. You merely turn the hot water faucet for a cupful or gallons of steaming water.

Why don't you, too, enjoy the comfort and convenience of a modern Automatic Gas Water Heater? It is the cheapest way to heat water in the home.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned·Operated·Managed
by Californians

237-828

Reproduction of a 3 column 8 inch newspaper advertisement.

To sell Automatic Gas Water Heaters tell simple truths

Read over the advertisement pictured above. Each line is an every-day-truth which the great 86% of our population understands. So too, the intellectuals. Such facts are so simple they are often overlooked. But when found and dramatically told they strike the responsive chord. That sells.

The above advertisement will be printed in all the daily newspapers this month in the PGandE territory. It will help everyone sell more quality Automatic Gas Water Heaters.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned·Operated·Managed
by Californians

ENGINEERING GAS LINE PIPE

In February, 1927, it was decided to produce Gas Line Pipe by the SMITH-Welding Process.

The engineering knowledge for forming the steel and for applying the SMITH Welding process was immediately available. The machinery was not.

Engineering the Machinery

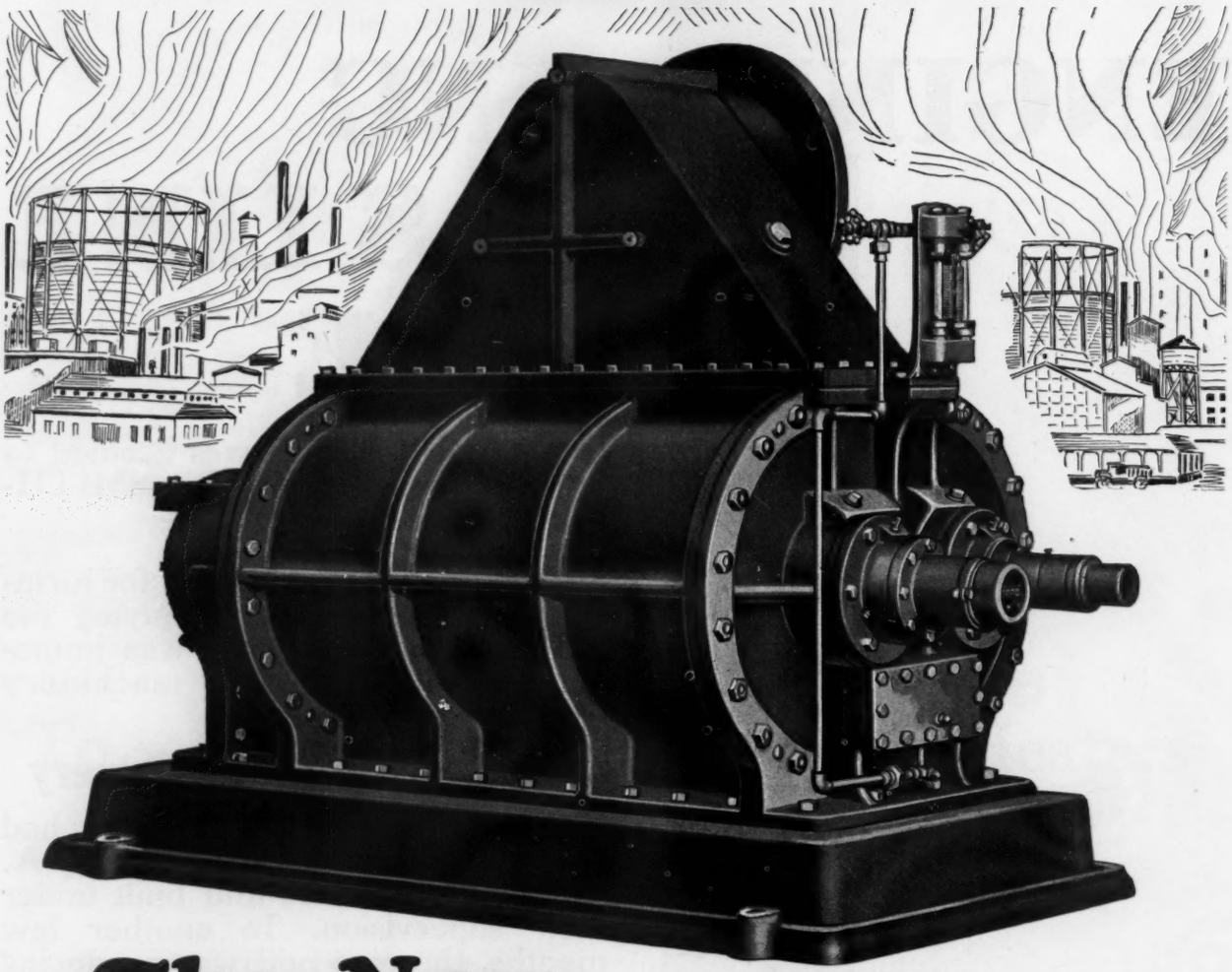
In 4 months' time, the machinery had been designed and engineered by A. O. Smith Engineers and built under their supervision. In another few months, the pipe mill was producing up to 8 miles of pipe per day.

This organized engineering talent is also available to co-operate with the pipe line engineers of our customers on matters that arise in the planning and construction of lines for the transportation of oil and gas.

A. O. SMITH CORPORATION
General Offices: Milwaukee, Wisconsin
Oil and Gas Field Products Division
District Offices at New York City, Pittsburgh, Tulsa, Houston, Los Angeles

SMITHSTEEL
GAS LINE PIPE

ROOTS



The New ROOTS METER

Simplified design and greater accessibility are the two major features in the new Roots Meter.

Complete Information on Request

The P. H. & F. M. ROOTS CO.

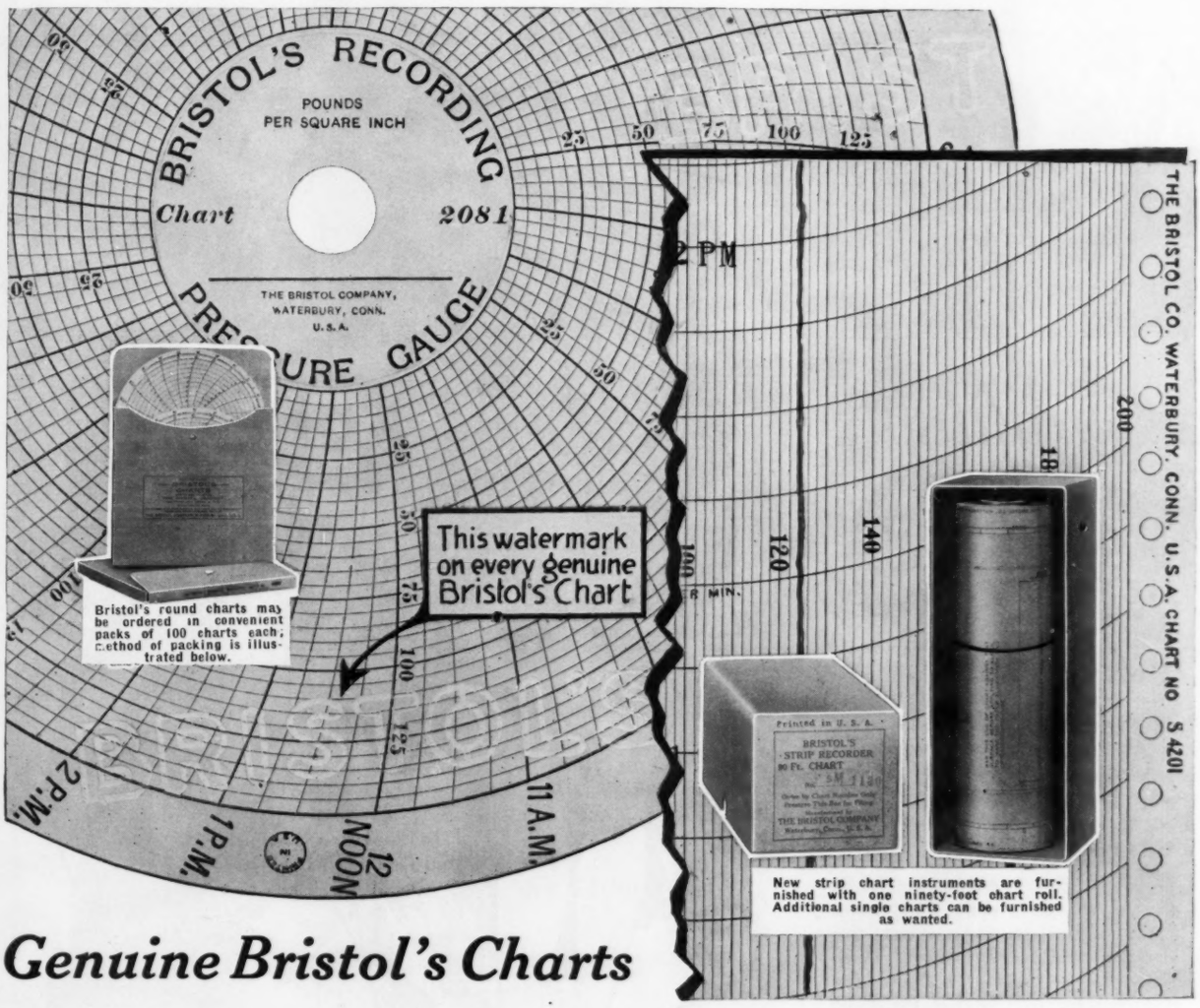
CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

WESTERN REPRESENTATIVE: SUTOR & COMPANY, 680 South Central Avenue, Los Angeles, California

Originators of the Double Impeller Rotary Principle


BRISTOL'S RECORDING
POUNDS
PER SQUARE INCH
Chart
2081
THE BRISTOL COMPANY,
WATERBURY, CONN.
U.S.A.
PRESSURE GAUGE
This watermark on every genuine Bristol's Chart
Bristol's round charts may be ordered in convenient packs of 100 charts each; method of packing is illustrated below.
2 PM
THE BRISTOL CO. WATERBURY, CONN. U.S.A. CHART NO S 4201
BRISTOL'S STRIP RECORDER 30 Ft. CHART
New strip chart instruments are furnished with one ninety-foot chart roll. Additional single charts can be furnished as wanted.

Genuine Bristol's Charts

Are Accurate ---

and the High Standard Performance of Bristol's Instruments can only be guaranteed *when they are used.*

TO identify them, every round chart is printed on paper having water mark reading "BRISTOL'S", and the name of The Bristol Company printed in the center; all strip charts having "The Bristol Company" printed on the side.

Even the paper on which Bristol's charts are printed is made especially for the purpose. All charts are printed from extremely accurate engravings, and under uniform humidity conditions in our own plant at Waterbury, Conn.

Also, every Bristol's Recording Instrument is carefully calibrated to be used with the particular chart specified as most suitable for the application in hand. This makes it necessary that the charts used for such application be identical, without the slightest variation, in order to assure continuous accuracy.

Thus in all matters pertaining to the design and printing of Bristol's charts, every attention is given to the finest details, with the idea in mind of making "Bristol's Charts" absolutely accurate and reliable under all conditions. And in addition to the high standard upheld in the making of Bristol's charts, they are, in almost every instance, procurable at a remarkably low cost.

All of which should lead those who are responsible for the maintenance of accurate instrument service to safeguard their own interests by using only the genuine Bristol's Chart.

The Bristol Company, Waterbury, Conn.

A profitable response to beauty's call

THE call of the kitchen may appeal to the young June bride; it also may be the correct approach for the purveyor of scrubbing brushes and laundry soaps but, the kitchen door is the *wrong* entrance for the modern water heater salesman.

Welsbach Hotzone representatives are well aware of this. They keep their sales talk away from the kitchen and the laundry. They place hot water in a far more profitable field—the field of beauty aids.

Famous beauty specialists and outstanding soap and cosmetic advertisers all recognize hot water as an absolute necessity to even the everyday beauty treatments. They have nominated hot water as a beauty aid on the first ballot. It's up to every Hotzone salesman to get aboard the bandwagon.

At this particular time of year, the response to beauty's call will prove most profitable. Dust, dirt, freckles and the whole catalog of summer complexion enemies are now actively engaged on your side of the selling line.

To start your sales ball rolling we have prepared an unusually striking series of newspaper advertisements. They make Hotzone Water Heaters assume an entirely new importance. These advertisements will be sent to you in complete electrotype form, all ready for insertion in your local paper. Write for a set of proofs today. Address the Welsbach Company, San Francisco Office, 863-865 Mission Street.

Member American Gas Association
Member Pacific Coast Gas Assn.

Welsbach
SELF ACTION GAS

HOTZONE
WATER HEATER

No. 112

No. 65

No. 60

No. 102

No. 85

It Is *New* Business

Practically every Humphrey Radiantfire sale is *new business* for the gas company—it *adds to* the load, because it creates a new use for gas fuel wherever it is installed.

Judged from this view point alone, there is not a more desirable sale to be made than the sale of a Humphrey Radiantfire. . . .

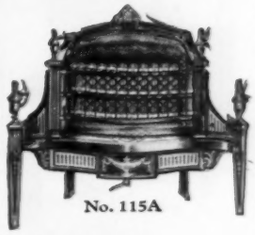
. . . for every Radiantfire sold *increases* the load.

It pays to go after Humphrey Radiantfire business.

No. 45

No. 30

No. 25

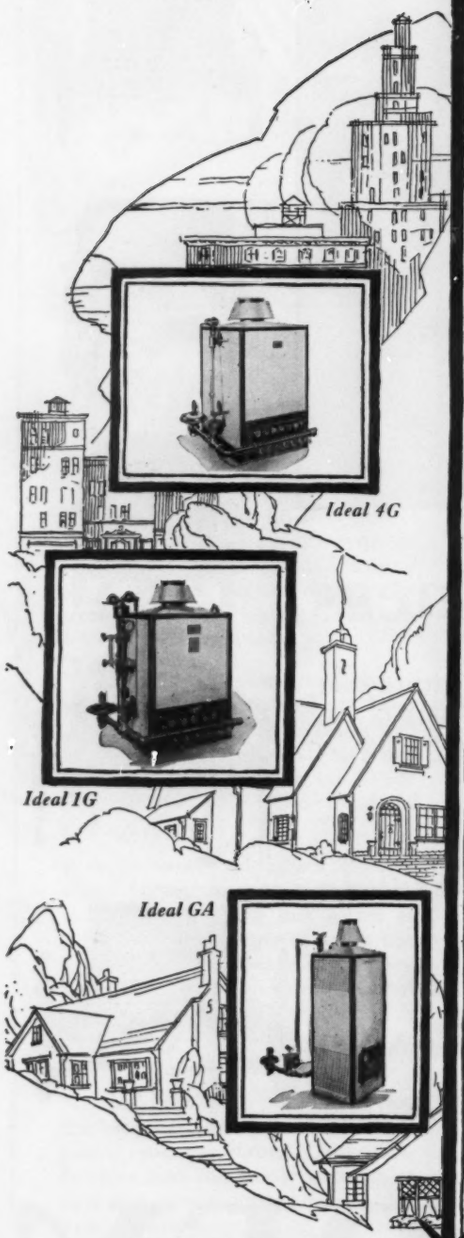

No. 115A

No. 80

The HUMPHREY Radiantfire

Pacific Coast Manager
C. B. Babcock
135 Bluxome St.,
San Francisco

Manufactured by
General Gas Light Co.
Kalamazoo, Mich.



AN IDEAL GAS BOILER *for* EVERY *heating need!*

For cottages or bungalows—with or without basements—an Ideal Arcola Gas Heater!

For small or medium-sized homes —Ideal 1G Gas Boiler!

For larger homes and buildings— Ideal 4G Gas Boiler!

For office buildings, big apartment houses, hotels — Ideal 4G Gas Boilers in multiple units!

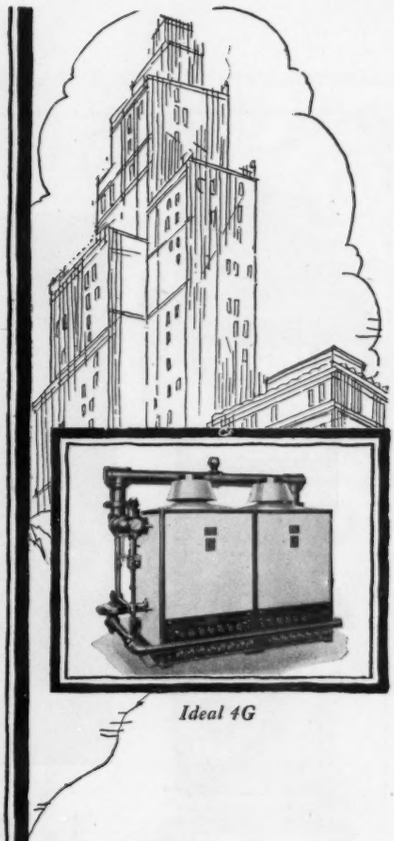
All these boilers are useful for large-volume hot-water supply and industrial applications.

THIS whole family of perfectly-designed gas boilers offers you *exactly* the right heating plant for *every* job on which you want to figure.

Designed and manufactured by the American Radiator Company, it is the latest triumph of their boiler engineers.

Ideal Gas Boilers are made available to you without delay by strategically-located distribution centers.

We have prepared for you a plan book covering every detail of selling plans that actually *work*. Won't you send for this complete and practical information?

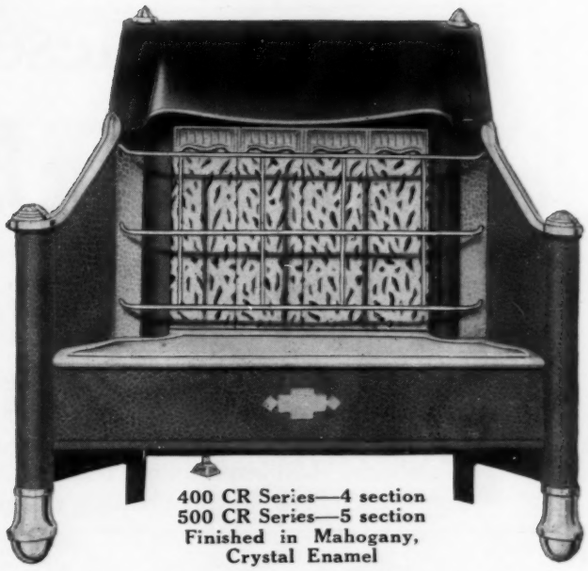


IDEAL GAS BOILERS

Product of AMERICAN RADIATOR COMPANY *Gas Utilization Dept.*

Write to AMERICAN GAS PRODUCTS CORPORATION, *Distributors*

376 Lafayette Street, New York City



400 CR Series—4 section
500 CR Series—5 section
Finished in Mahogany,
Crystal Enamel

Get these

"Profits that never end!"

Here's the way to make two profits grow where none grew before. Sell your unprofitable customer a Roper Sheetflame Radiant Heater.

You profit once on the sale itself. You profit again on the increased use of gas per meter. And that second profit never ends—it repeats itself every month the Roper Sheetflame is used.

This modern heating unit employs the correct principle of heat radiation. It is the only heater which operates with a solid sheet of flame extending across the entire heating surface.

A full variety of designs and sizes meets every preference as to price and appearance. You may offer your customer his color choice of Mahogany Crystal Enamel, Red Brown or Green Crystal Enamel and Black Enamel Finish. Antique Brass, Oxidized Brass and French Gray, also available.

Learn how the Roper Sheetflame Radiant Heater line can add to your profit from sales of both appliances and gas. Write for complete information.

GEO. D. ROPER CORPORATION
Rockford, Ill.

ROPER

Sheetflame
RADIANT HEATERS

No. 401—4 section
No. 501—5 section
Finished in Antique
Brass or French Gray

No. 541—5 section
No. 641—6 section
Finished in Antique
Brass or French Gray

All Roper Sheetflame Radiant Heaters carry the Blue Star Seal of Approval of The American Gas Association Testing Laboratory.

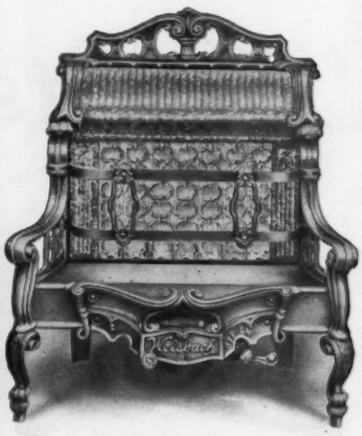
THE SOLID SHEET THROWS OUT MORE HEAT

Let these three new *Welsbach Heaters* score for you

Here they are, all ready to go to bat: Numbers 67, 69 and 71. A more brilliant trio of radiant gas heaters never warmed a manager's heart or lifted a sales quota for a greater number of satisfied customers. Each one has the Welsbach "Million-Dollar" burner, improved header, choke and flue connection—exclusive features which never fail to register safe hits.

No. 67—10 Glowers
Golden brown finish. Height, 23 inches. Depth, 11½ inches. Width, 24 inches.

No. 69—12 Glowers
Golden brown finish. Height, 23 inches. Depth, 11½ inches. Width, 28 inches.



No. 71—7 Glowers
Golden Brown finish. Height, 23 inches. Depth, 11½ inches. Width, 20¼ inches.

Of course, you will want to include the famous fast-selling Welsbach veterans in your line-up: particularly Numbers 47, 49, and 51.

All Welsbach heaters bat 1000% in appearance as well as performance. They are beautifully designed along artistic lines and finished in silver, golden brown and many other attractive finishes. And—their remarkable price range enables them to profitably connect with every high or low offer that comes within striking distance. Write for complete information today.

Welsbach Radiant Gas Heaters

Approved by the A. G. A. Testing Laboratory
Approved by Good Housekeeping Institute

Member of American Gas Association
Member of Pacific Gas Association

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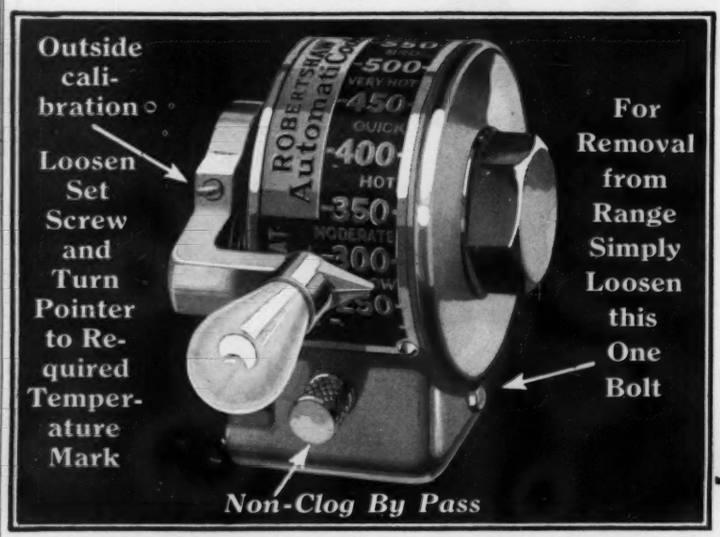
GAS COMPANIES and STOVE DEALERS



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Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

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The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

WESTERN GAS

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

SAN FRANCISCO **LOS ANGELES** **DALLAS**

Is There *a Best* Method *of* Paying *for* Appliance Sales Results?

Pacific Coast Gas Association Questionnaire Puts Four Pertinent Queries to Sales Executives of Western Gas Utilities

AN INQUIRY SENT TO Pacific Coast Gas Association headquarters by a sales manager in search of ideas resulted in this valuable Association questionnaire on salesman and employee compensation for appliance sales. Twelve western utility sales heads outline practices followed in their companies in the material published below.—EDITOR.

QUESTION 1: Does your company ask employees other than salesmen to turn in prospects for appliance sales, and if so does it give commissions or bonuses to these employees when actual sales result?

Company A—We ask employes to turn in tips, but do not pay commissions except during specific campaigns.

Company A-1—In this division we give commissions the year round to employees.

Company C—This company expects its employees, other than salesmen, to turn in merchandise prospects. At the present time we are not paying any bonuses or commissions to employees, other than salesmen, for these tips. We have experimented with a number of these bonus plans, none of which have worked satisfactorily. We at one time paid $2.00 for range and water heater prospects and $1.00 for space heater prospects but do not at this time.

Company D—In connection with the matter of employees other than salesmen turning in appliance prospects, will say that we have succeeded in making practically every employee of this company, including plant men, shop men and office men and girls, part-time salesmen. For a long time we have appreciated the value of the cooperation of all employees and have encouraged the turning in of tips, upon which bonuses are paid in order to keep the entire organization in touch with the sales policies of our company.

Company F—All company employees are furnished with a prospect book, and are paid in accordance with the printed instructions in the book. (See answer to Question 2.)

Company G—We do not pay any commissions to employees except our salesmen who are on a commission basis and drawing account.

Company J—It is the desire of this company to enlist the services of all its employees in the selling of gas and gas appliances. We have a very attractive offer to make to all employees excepting those who are now engaged in the sales department.

We will pay eligible employees for completed sales on the following basis:

(1) Employee must file with sales department a card containing:

(a) Name of Prospect.
(b) Address.
(c) Date of employee's interview with prospect.
(d) Date salesmen should call.
(e) Brief statement of prospect's interest in gas.

(2) No bonus will be paid in full unless the above information is filed before the salesman calls.

Company K—We do not ask employees other than salesmen to turn in prospects for appliance sales.

QUESTION 2: What is the character of your remuneration; that is, is it a flat percentage of the sales price, or have you a fixed schedule varying with the type of appliance?

Company A—During campaigns we give a flat price instead of a commission.

Company A-1—A flat price of 2 per cent of the selling price of the appliance, not installed, is paid to all employees other than salesmen for tips turned in which results in sales within 60 days.

Company C—The character of our sales compensation is as follows: Salesmen receive $100 per month guaranteed, with a straight 10 per cent commission on all business exceeding $500. We have not, as yet, laid out any graduation sales compensation scheme. Our 25 salesmen are satisfied, are turning in good business and are averaging from $200 to $400 per month. Since results are what we want, this present plan is producing satisfaction.

Company D—The following bonuses are paid employees other than the regular salesmen on tips turned in where a sale is made (the tip being turned in and sale closed by the regular salesmen): Gas range, $2.50; water heater, $2.00;

space heater, $1.00; new meter, $2.00; house heating installation, $5.00; gas refrigerators, $5.00.

Company F—Salesmen receive a flat salary with the possibility of earning extra money through prizes in competition with other salesmen. Operating employees are compensated for their prospects closed according to the instructions which are printed in the prospect books furnished employees. These are as follows:

"What is a prospective buyer? It's a person who feels that he needs a product and has means to pay for it. A lot of us may feel that we need a Rolls-Royce, but if we haven't the money, we're not good prospects.

"Here's a better example: In your district is a woman who hasn't an electric washer, for instance, but feels that she needs one. She's been partially "sold" to the idea of having a washer, but she hasn't come to the point where she may be willing to sacrifice some other convenience or comfort in order to rid herself of wash-day drudgery. Perhaps if one of our salesmen could talk to her and make a demonstration, she would arrange to buy this appliance.

"Now everyone knows that there is a certain amount of expense in selling any product. And whenever possible, we want to repay our own employees for their sales efforts, rather than pay outside people. So we are offering you $1.00 if you will turn in the names of ten (10) bona fide prospective buyers of appliances (or 10c per name).

"A good way to start a conversation with a prospect is to talk about an appliance upon which there is a company drive that month. Ask 'Mrs. Jones' if she has seen it. If she has or hasn't and seems interested, tell her more about it. (If you think that she would be interested in the easy terms, tell her about them.) If she already has this appliance ask her how she likes it. Then suggest some other appliance which the company has to offer. It must be one selling for $10.00 or more.

"Before you get through with such a conversation, you're going to have a prospect for some appliance. Write her name, address, telephone number, and the appliance on one of the blanks in this book. Under remarks, state whether she is considering some other appliance and any other information which you think will help the salesman who calls on her next. If the prospect is interested in more than one appliance, make out a separate blank. And be sure to sign your name to each blank.

"This book contains ten (10) prospect blanks in duplicate. Tear out the duplicate (cardboard) copy and turn into your local office as soon as possible. Retain the original (paper) copy in your book.

"When you have secured ten prospects, turn in this book to your local office. As soon as the names have been verified to avoid duplication (you realize, of course, that if someone else has turned in the name first, you cannot receive credit for it), you will be paid $1.00 for the ten (10) names, or at the rate of 10c per name.

"If within sixty (60) days after you have turned in a name, this prospect purchases the appliance you have named, you will get 2 per cent of the selling price. Suppose that the appliance is a gas or electric range. That would mean that you would get from $2.00 to $4.00 for calling upon a prospect and turning in his name!

"If at the end of sixty (60) days your prospect has not been sold the appliance, you can turn in his name again—providing that you call and talk about this appliance.

"Keep calling on prospects and telling them about appliances. The dimes and commission will add up rapidly for you. When you have used up this book you can get another at your local office."

Company G—We generally have some mid-summer campaigns for about one month and during this campaign we arrange it so that our employees can participate, and arrange a commission that is attractive.

Company J—A 1 per cent commission will be paid on all sales resulting from leads developed by employees, that cannot be classified under section (1) (Question 1). Basis of payment is:

(1) Furnaces and boilers for house heating	$5.00
(2) Floor furnaces, radiantfires, heatrolas and other similar heating appliances, per appliance	2.00
(3) New ranges that sell for $100 or more	2.00
(4) New ranges that sell for $50-$100	1.50
(5) Used ranges or new selling for less than $50	1.00
(6) Water heaters	2.00
(7) Special appliances such as restaurant, hotel or industrial appliances will be paid for on an agreeable basis.	
(8) The addition of a new customer who remains on our lines 6 months or more (A new customer is one who applies for new service for the supply of gas.)	3.00
(9) The addition of a *new customer on an old service* who will remain on our lines for 6 months or more	4.00

In addition, special prizes are offered during campaigns for the employee who earns the greatest reward in commissions.

QUESTION 3: Are these prospects turned over to salesmen to close, and if so is the amount paid the employee who originally secures the prospect deducted from the salesmen's commission?

Company A and A1—Prospects are turned over to salesmen to close but the amount paid employee is not deducted from salesmen's commission.

Company C—Since no compensation is given to the people turning in prospects, it is unnecessary to deduct any commission from the salesmen. However, in the past when we did pay the $2.00 per prospect for sales, we did not deduct any of the bonuses from the salesmen, he receiving a straight 10 per cent.

Company F—Salesmen are paid a flat salary which has nothing to do with the 2 per cent paid the operating employees for prospects. Prospects are turned over to the salesmen. However, if an employee feels he can close the sale he may do so, although no other compensation is given him for so doing.

Company G—Prospects are turned over to our regular salesmen, and if sale is closed during this special campaign, the regular commission is paid the salesmen and commission is also paid the employee who turned in the prospect.

Company J—Prospects are turned over to salesmen to close and the amount paid the employee is deducted from the salesman's commission.

Company K—Voluntary tips are run down at once by salesmen.

QUESTION 4: If possible state briefly your whole scheme of compensating salesmen and employees, giving the percentages paid and stating whether or not salesmen are paid a salary in addition. It would be helpful to have your ideas as to the success of the plan you follow.

Company A—Salesmen are paid a salary and commission. The salary scale is as follows: An inexperienced salesman starts at $135 per month. At the end of six months he is advanced to $150 per month. One year after, if he is satisfactory, his salary is increased to $165 per month and one year after that, he automatically receives $175 per month.

An experienced man will be started at $150 per month instead of $135. In addition to his salary, he receives a commission of 5 per cent on everything selling for over $25 and 10 per cent for everything under $25. During certain campaigns, we fix higher rates of commission. He is also given a car which is maintained by the company.

Company A-1—The above applies except that the salesmen receive a flat 7½ per cent commission in addition to salary and automobile.

Company B—Our company solicits all employees in the different departments to turn in prospects, supplying a printed form for this purpose, but there is no remuneration for so doing, the Company relying on the co-operative spirit for this work. These prospects are turned over to the district representatives. This was started about four months ago and quite a surprising number of prospects have been turned in.

We have two classifications of salesmen, junior and senior; the junior men receive a salary of $75 per month plus commission; the senior men, $100 plus commission. Each salesman is allotted a district and all sales from his territory are credited to him whether he actually closes the sale, or the sale is made in one of our showrooms. The amount paid on all domestic appliances, i. e., gas ranges, hot plates, tank and automatic water heaters, fires, refrigerators, etc., is 6 per

(Continued on Page 46)

Oblique aerial photograph showing erosion of north bank of the Red River. Lone Star Gas Company line crossings in background. Arrows indicate stream flow.

Aerial Photographic Surveys *for* Use *in* Locating Gas Lines

By LLOYD M. LONG
Fairchild Aerial Survey, Inc.
Dallas, Texas

AERIAL photography as an aid in locating pipe lines and power transmission lines has today reached a stage of development warranting an inquiry into its advantages and limitations.

The most practical methods of applying photographic survey for the location of pipe lines fall into two specific types. First, we have the location of a line through congested surface development, such as the approach to a densely populated center; second, we have the general routing of lines across more or less open country. The general location should be made in advance of the photographic flight by a co-operative study between the surveying crew and the constructors of the line. This preliminary study can be made by an observation flight so that the peculiar requirements of the line can be visualized and the surveys completed in the most direct manner.

SURFACE DETAILS SHOWN

This type of map shows in great detail, the existing surface development. It allows the location engineer to plot his course with the least physical obstruction as regards houses, structural hazards, costly Right of Way, angles and other interferences that demand more costly forms of construction or future maintenance. The permanence of location is evident from a close study of the surface drainage. Firm banks of rivers, loose surface soil, swamp lands, forrested territory and rocky surfaces each record in a distinctive manner. The Right of Way man is able to select those properties necessary for his line construction. The problem of easements is simplified as tentative routings are readily changed or established to pass through specific properties. The Right of Way agent approaches the individual property owner with complete information regarding each particular parcel of land and should close his deal with dispatch.

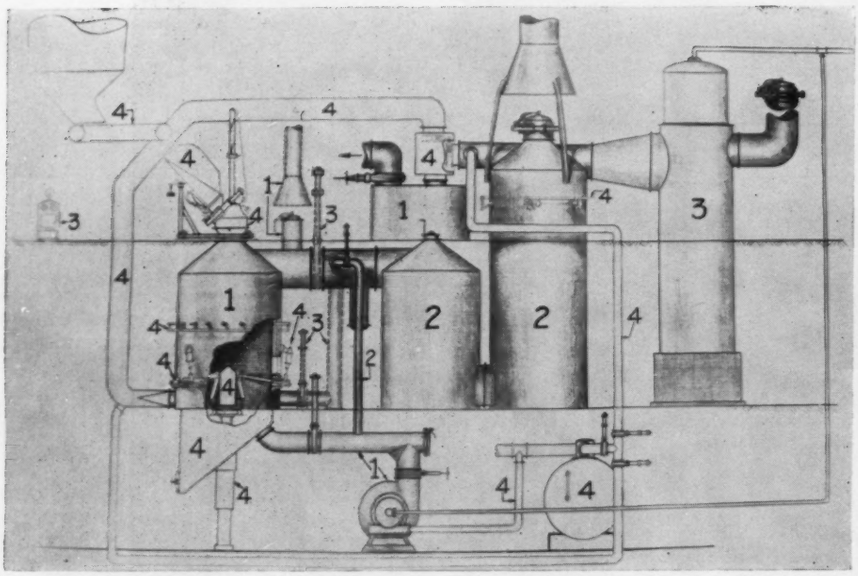
Close study of the photographic map prior to actual construction will permit the introduction of many small operating economies since the aerial map shows all available transportation, surface obstruction and the nature of the territory in thorough detail. All of this minute detail facilitates the planning of the work in general and naturally eliminates much of the office confusion resulting from incomplete knowledge of actual field conditions. Finally, the company secures a comprehensive map of the ter-

(Continued on Page 48)

Evolution *of the* Water Gas Machine

By FRANK W. STEERE

*Vice-President, Semet-Solvay Engineering Corporation**



THE water gas machine is a modification of the gas producer. Our first record of the gas producer was in 1832. The development of the water gas machine from the gas producer was natural and logical as producer gas contains all of the nitrogen of the air used for blasting, resulting in a gas of low B.t.u. value. It was a logical step to attempt the production of a higher B.t.u. gas by eliminating the nitrogen, leaving the carbon monoxide and hydrogen—which have approximately twice the calorific value of producer gas.

As the water gas reactions take place at temperatures above 1832°F., it was natural that some one should think of blasting the fuel bed until it reached incandescence and then shut off the air and make a gas run by admitting the steam alone. This was done by Ibbetson in 1834 and is our first record of the simple water gas process.

FIRST MADE DURING CIVIL WAR

Water gas was made during the Civil War and was used in observation balloons by the Army of the Potomac, but it was many years after this before this process was recognized as a possible source of gas for distribution by utilities. During the period of intensive oil development in the early seventies, Thaddeus S. C. Lowe conceived the idea of utilizing the sensible heat of the water gas in checker brick chambers—carburetor and superheater—for cracking oil and enriching the water gas with the oil gas so made. This was the beginning of the carbureted water gas process. The process was extremely crude and the consumption of both oil and generator fuel was very high, but the equipment was extremely simple, low in first cost, and proved to be very useful as standby equipment and in taking peak loads from the coal gas plant.

UP AND DOWN RUN INTRODUCED

No basic improvements were made in the process until about 1898, when the up and down run feature was developed. This was accomplished by placing a valve in the offtake to the generator and making a connection from the bottom of the generator directly to the top of the carburetor with a valve located in this connection at the base of the generator. After the blasting period, the steam was turned into the base of the generator with the lower hot valve closed so that the water gas made passed out of the top of the generator into the carburetor as previously. The machine was run in this manner for approximately half the possible gas-making period and then the upper hot valve was closed and the lower hot valve opened. Steam was then admitted to the top of the generator and passed down through the generator, with the usual water gas reactions. The gas so made passed through the connection at the base of the generator and directly to the top of the carburetor. This made it possible to introduce oil into the carburetor during both the up and down run parts of the gas-making cycle.

No further basic improvements in the water gas machine were made until the invention of the so-called Backrun by Daniel J. Young in 1921. The improvements during this long period consisted of mechanical refinements and in more accurately balancing the designs of the different parts of the machine, enlarging the connections and increasing the capacity by reducing the time lost in changing the valves.

PERIODS IN DEVELOPMENT

The historian's method of describing the evolution of the water gas machine would be to divide its development into periods. The first period would date from the invention of the water gas process, in 1834, to Lowe's invention of carbureting with oil, in 1872. The first period then covers the development of the simple water gas process or blue gas process, as it is frequently called.

The second period would date from the invention of the carbureted water gas process, in 1872, to the invention of the up and down run process in 1898. This period could be thought of as an era of cheap oil and crude, inexpensive equipment.

The third period would extend from 1898, with the invention of the up and down run, to 1921, the year of the invention of the Backrun process.

The fourth and last period of the development of the water gas machine, which can be thought of as the Backrun period, dates from 1921 up to the present time.

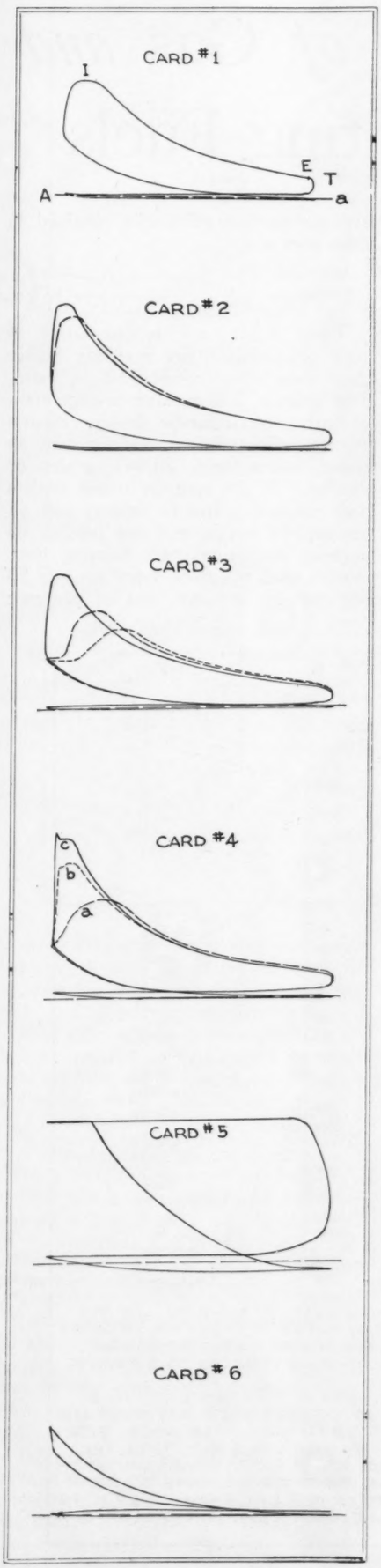
DIAGRAM EXPLAINED

In order to illustrate more clearly the steps in the development of the water gas process, I have prepared a diagrammatic sketch of a complete water gas machine in which the various elements are numbered from one to four to indicate the period in which they were developed. The equipment shown in dotted lines has been eliminated by subsequent improvements.

The equipment of the first period, numbered One, consists of a brick-lined shell with grates, forming a generator; a stack and valve; a wash box or seal to prevent the gas coming back into the machine after the run; a blower for

(Continued on Page 43)

* An address delivered before the Canadian Gas Association, at its annual convention at Hamilton, Ontario, June 21, 1928.



Practical Use *of the* Indicator *in* Gas Compressor *and* Gas Engine Work

Part II

By Elting Henderson
Southern California Gas Company

IN HIS FIRST contribution on this topic, appearing in *Western Gas* for May, 1928, the author dealt with use of the indicator in gas compressor operation. This concluding installment has to do with practical use of the indicator for gas engines.—*EDITOR.*

As mentioned in a previous article on compressor indicating the highest value of the indicator to the average gas engine operation is realized when it is used to determine the mechanical condition of the cylinder and the timing of the events. The importance of using a spring that will give the largest diagram possible should also be remembered.

Card No. 1

Card No. 1 of those reproduced with this article shows an average good, partail load diagram, with a maximum initial pressure of 210 lbs. An increase in load would cause an increase in initial pressure and also tend to bring the diagram at "I" to a point, since the increased load would increase the compression and the rate of flame propagation increases with the compression. No effort should be made to obtain the same appearance at point "I" in a diagram taken on partial load as on full load, unless the engine is running constantly on part load, because the ignition timing necessary to produce that appearance on part load will be too early for full load when the rate of flame propagation is increased by the increase in compression pressure.

Card No. 2

Card No. 2 is an average full load diagram on a cylinder in mechanically perfect condition. The ignition might be retarded slightly, thus lessening the initial pressure and the resultant high bearing pressure without decreasing the work done. The diagram would then take the course indicated by the dotted line.

Card No. 3

Card No. 3 indicates the effect of late ignition. The work done with the retarded spark is greatly reduced, causing loss of power and waste of fuel; terminal pressure and temperature are high, causing unnecessarily high temperature on the exhaust valve and seat, and since with the best operating conditions the concentration of heat at this point necessitates more frequent replacement and repair than any other major engine part, any excess heat should be avoided.

Card No. 4

Card No. 4 indicates the effect of different mixtures on the rate of flame propagation—(a) is a very lean mixture, (c) a fairly rich mixture, and (b) indicates the correct mixture. If the proportion of gas is increased beyond (c), the rate of flame propagation again decreases and a diagram similar to (a) will result, a condition that should always be avoided because an excessively rich mixture will cause soot and carbon, and destroy the lubrication. As a safety measure and for the best fuel economy the mixture should be kept on the lean side.

A comparison of No. 3 and No. 4 reveals plainly the difference between a slow burning mixture and late ignition.

Card No. 5

Card No. 5 is a low pressure diagram taken with a 20 lb. spring to indicate the inlet and exhaust pressures. It reveals excessive back-pressure on the exhaust line and that the cylinder does not fill up to atmospheric pressure on the inlet stroke. If the governing valve is in wide open position when a diagram of this appearance is taken, an increase in port area or air inlet area, or both, will give a greatly increased M.E.P. Also, the exhaust piping is too small or the muffler, if one is used, causes an unnecessarily high exhaust pressure. Correctly designed exhaust lines will allow the exhaust pressure to fall to atmospheric pressure and in some cases slightly below.

(Continued on Page 50)

Getting *at the* True Costs *of* Gas *and* Competitive House Heating Fuels

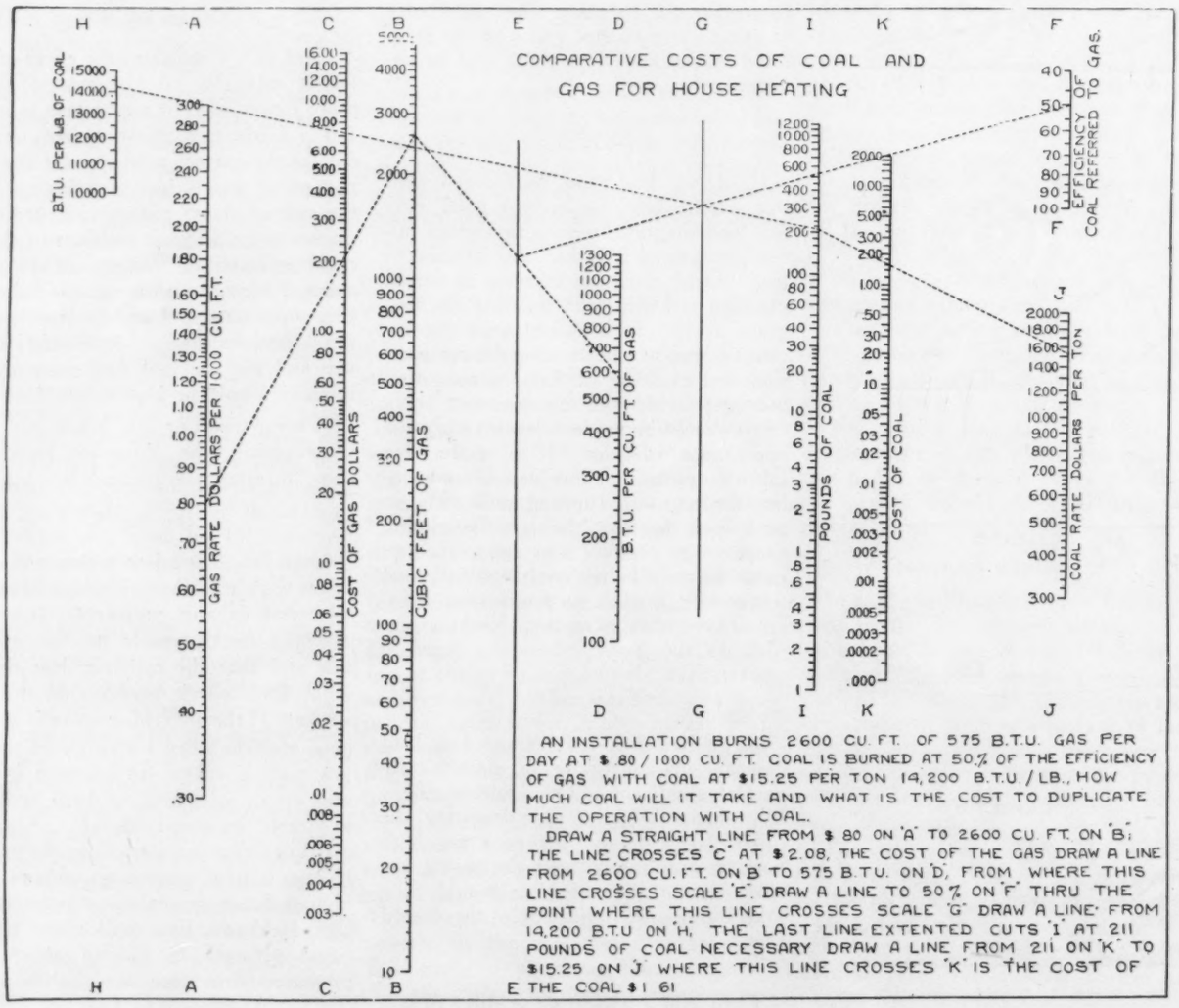
By LYMAN M. VAN DER PYL
Chief Chemist, Pittsburgh Equitable Meter Company

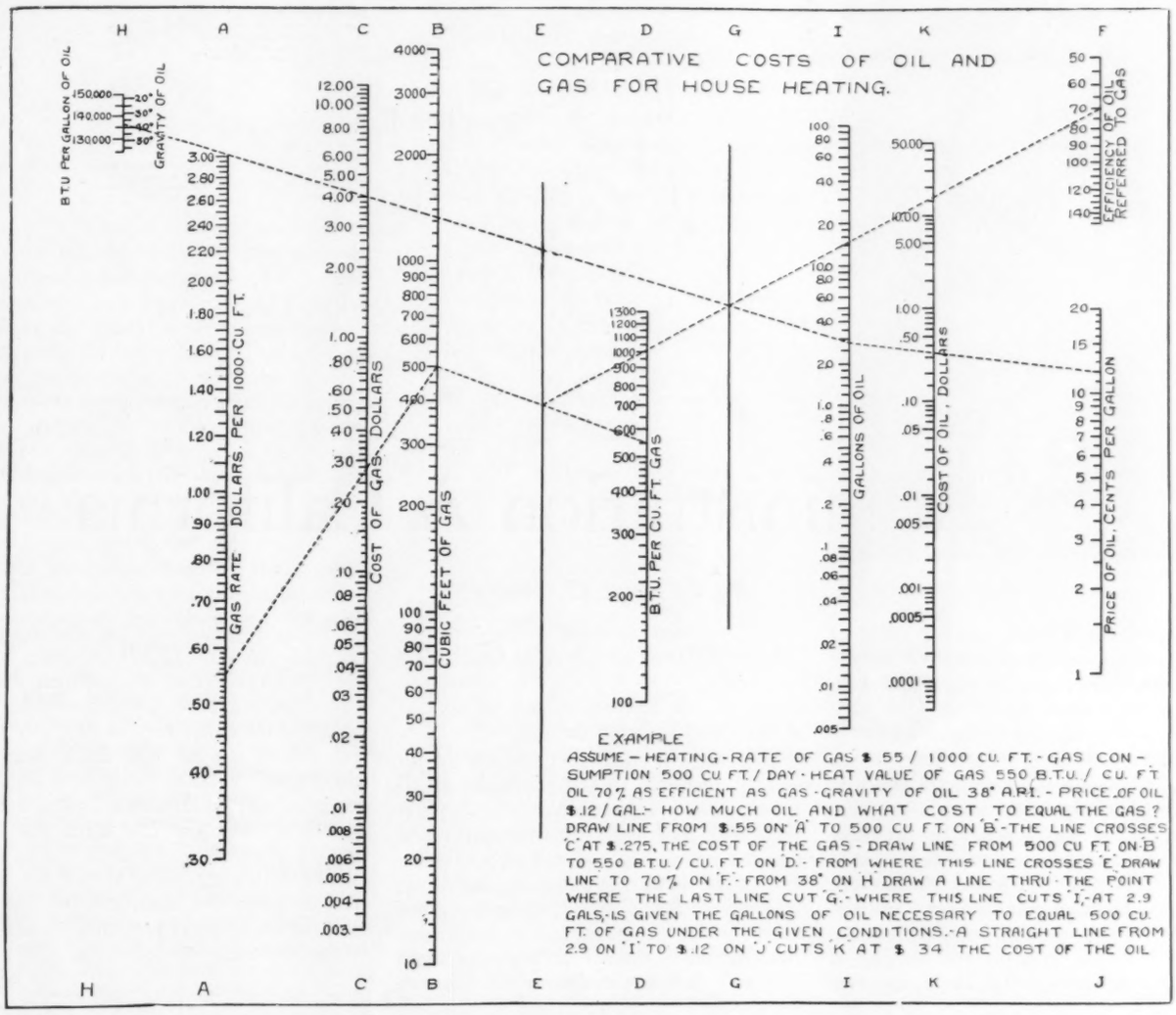
HOUSE heating by means of gas has long since passed out of the experimental stage, and its wide use in natural gas localities and its growing use in manufactured gas communities are good indications of its popularity. Chief among its advantages have been mentioned its cleanliness, the convenience and simplicity of its automatice operation, and the ready availability and certainty of price of its fuel supply, but a common idea among the uninitiated is that gas is an expensive fuel. To show that this is far from the truth is the purpose of this paper. There are many factors entering into the cost of heating and all must be considered if the true cost is to be determined. Naturally the cost of the fuel is the first point to be listed, and others will be added as we progress.

To begin with, 1000 B.t.u.'s in the form of oil or coal is not the same as 1000 B.t.u.'s in the form of gas, from the standpoint of warmth that can be obtained by burning them, and the efficiencies of combustion must be consulted. In the United States Bureau of Mines Technical Paper No. 315 are reported the results of tests, using anthracite and bituminous coals and coke in four different types of boilers; the average thermal efficiencies obtained in these tests are:

Anthracite Coal	66.2%
Bituminous Coal	55.1%
Coke	67.0%

These figures are representative of good practice and are probably higher than those usually obtained in hand-fired boilers. For instance, a large manufacturer of domestic boilers reports average efficiencies of 63 per cent in round boilers with 20-inch grates or smaller, 57 per cent in round boilers with 24-inch grates or larger, and 65 per cent in square sectional boilers, all burning anthracite coal; burning bituminous coal, the three types average 50 per cent, 55 per cent, and 62 per cent


COMPARATIVE COSTS OF COAL AND GAS FOR HOUSE HEATING
H
A
C
B
E
D
G
I
K
F
J
BTU. PER LB. OF COAL
GAS RATE DOLLARS PER 1000 CU. FT.
COST OF GAS DOLLARS
CUBIC FEET OF GAS
B.T.U. PER CU. FT. OF GAS
POUNDS OF COAL
COST OF COAL
EFFICIENCY OF COAL REFERRED TO GAS.
COAL RATE DOLLARS PER TON
AN INSTALLATION BURNS 2600 CU. FT. OF 575 B.T.U. GAS PER DAY AT $.80 / 1000 CU. FT. COAL IS BURNED AT 50% OF THE EFFICIENCY OF GAS WITH COAL AT $15.25 PER TON 14,200 B.T.U. / LB., HOW MUCH COAL WILL IT TAKE AND WHAT IS THE COST TO DUPLICATE THE OPERATION WITH COAL.
DRAW A STRAIGHT LINE FROM $ 80 ON 'A' TO 2600 CU. FT. ON 'B'; THE LINE CROSSES 'C' AT $2.08, THE COST OF THE GAS DRAW A LINE FROM 2600 CU. FT. ON 'B' TO 575 B.T.U. ON 'D', FROM WHERE THIS LINE CROSSES SCALE 'E' DRAW A LINE TO 50% ON 'F' THRU THE POINT WHERE THIS LINE CROSSES SCALE 'G' DRAW A LINE FROM 14,200 B.T.U ON 'H' THE LAST LINE EXTENTED CUTS 'I' AT 211 POUNDS OF COAL NECESSARY DRAW A LINE FROM 211 ON 'K' TO $15.25 ON 'J' WHERE THIS LINE CROSSES 'K' IS THE COST OF
E THE COAL $1 61


COMPARATIVE COSTS OF OIL AND GAS FOR HOUSE HEATING.
BTU PER GALLON OF OIL
GRAVITY OF OIL
GAS RATE DOLLARS PER 1000 CU FT
COST OF GAS DOLLARS
CUBIC FEET OF GAS
BTU PER CU FT GAS
GALLONS OF OIL
COST OF OIL, DOLLARS
EFFICIENCY OF OIL REFERRED TO GAS
PRICE OF OIL, CENTS PER GALLON
EXAMPLE
ASSUME - HEATING-RATE OF GAS $ 55 / 1000 CU. FT. - GAS CONSUMPTION 500 CU FT / DAY - HEAT VALUE OF GAS 550 B.T.U. / CU. FT OIL 70 % AS EFFICIENT AS GAS - GRAVITY OF OIL 38° A.P.I. - PRICE OF OIL $.12 / GAL.- HOW MUCH OIL AND WHAT COST TO EQUAL THE GAS? DRAW LINE FROM $.55 ON 'A' TO 500 CU FT. ON 'B' - THE LINE CROSSES 'C' AT $.275, THE COST OF THE GAS - DRAW LINE FROM 500 CU FT ON 'B' TO 550 B.T.U. / CU. FT. ON 'D' - FROM WHERE THIS LINE CROSSES 'E' DRAW LINE TO 70 % ON 'F' - FROM 38° ON 'H' DRAW A LINE THRU THE POINT WHERE THE LAST LINE CUT 'G' - WHERE THIS LINE CUTS 'I' AT 2.9 GALS. IS GIVEN THE GALLONS OF OIL NECESSARY TO EQUAL 500 CU. FT. OF GAS UNDER THE GIVEN CONDITIONS. A STRAIGHT LINE FROM 2.9 ON 'I' TO $.12 ON 'J' CUTS 'K' AT $ 34 THE COST OF THE OIL

respectively. For the calculations to follow the Bureau of Mines figures will be rounded off to 65 per cent, 55 per cent, and 65 per cent respectively.

The efficiency figures used by the oil burner industry in figuring on its products installed in various types of boilers are as follows:

In round boilers	55-65%
In sectional cast-iron boilers	60-70%
In boilers designed for fuel oil	70-75%
For general average conditions	60-65%

The minimum thermal efficiencies required of gas heaters for the approval of the American Gas Association are:

Gas boilers	75%
Gas warm-air furnaces	70%
Gas floor furnaces	60%

In practice the average efficiencies will be above these minima; for certain gas boilers, in fact, efficiencies of 83 per cent and 84 per cent are guaranteed. For these calculations the average efficiency will be taken as 80 per cent.

All these figures represent the efficiencies under continuous test conditions, without interruptions or fluctuations in the load. Naturally it is impossible to make a heater follow the changes of the weather absolutely, and the difference will represent a lowering of the continuous test efficiencies. Professor J. C. Smallwood of the School of Engineering of Johns Hopkins University has made tests that indicate that the efficiencies of oil burners is cut 15 per cent by intermittent or seasonal operation, while coal and gas heaters are cut 25 per cent and 10 per cent respectively. He states that these figures are based on incomplete tests and are, therefore, not to be considered exact, but they check well with other information scattered through the literature and if they are applied to the figures given for continuous test conditions, the following efficiencies for seasonal operation will be obtained:

Anthracite coal and coke	49%
Bituminous coal	41%
Oil (in round boilers)	47-55%
Oil (in sectional boiler)	51-60%
Oil (in special boiler)	60-64%
Oil (in average installation)	51-55%
Gas	72%

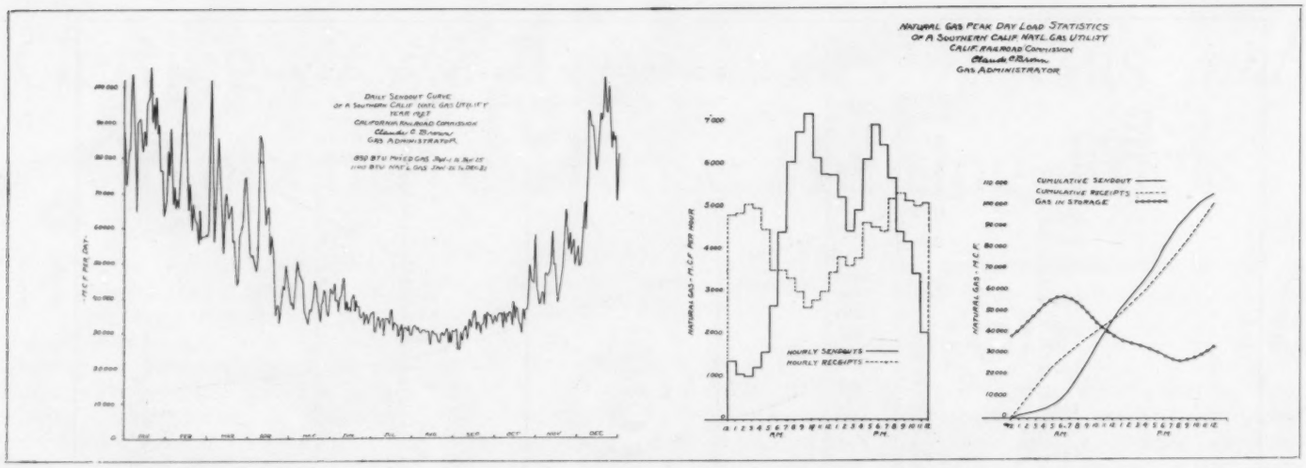
These figures should be used in comparing the different fuels.

Finally, if all these are referred to the gas efficiency, we obtain the following figures:

	% of Gas Efficiency
Anthracite coal or coke	68%
Bituminous coal	51%
Oil (in round boiler)	59-69%
Oil (in sectional boiler)	63-75%
Oil (in special boiler)	75-80%
Oil (for average installation)	63-69%
Gas	100%

These last figures should be used on the scales marked "F" in the accompanying alignment charts. By means of these charts the relative fuel costs of gas and coal and gas and oil may be determined graphically; the examples given with the charts will illustrate their use, and an examination will reveal that they may be used for determining any one of the factors, provided the others are known. For instance, with a given consumption of coal or oil, the equivalent consumption of gas may be found; or, knowing the grade and cost of the competitive fuel and with the other information given in this paper, one may compute

(Continued on Page 52)



Gas Administration *in* California

By CLAUDE C. BROWN

Gas Administrator
Railroad Commission, State of California

IN CALIFORNIA, gas has come to be recognized and accepted as the ideal fuel for practically every purpose where heat is required. It is used almost universally in the California home for space-heating, water heating and cooking, and is steadily encroaching upon the field of refrigeration.

Not only is it used generally for these domestic requirements but it is also used as a fuel in large quantities throughout the year by large numbers of commercial enterprises such as bakeries, restaurants, canneries, and for the heating of apartments, hotels, office buildings, theatres, etc.

INDUSTRIAL LOAD GROWING

The use of gas as an industrial fuel has increased tremendously within the last few years. As a matter of fact, there is scarcely an industry in California that does not use large quantities of this fuel in its process, while some of the larger consumers use as high as seven or eight million cubic feet per day.

The number of gas consumers in this state has steadily increased until at the present time it has reached a total of some 1,200,000 users. The consumption of gas by these consumers has increased due to the constantly increasing number of uses for gas, the manufacture and distribution of better and more efficient appliances, and the standard of gas service being rendered by the California utilities.

The reason for this general and widespread use is obvious. In the first place the efficiency of combustion of this fuel is very high and when it is burned in properly adjusted appliances under proper conditions, it produces a smokeless, odorless flame of intense heat, which leaves no ash and which can be applied at the exact location desired.

The use of this fuel, which is instantly available to the consumer at all times, does not necessitate the installation, with its consequent investment and cost of operation and upkeep, of storage tanks, bunkers, pumping, handling, stoking or ash disposal equipment, but requires for its satisfactory utilization nothing more than a properly adjusted burner. It is not necessary for the consumer to purchase quantities of this fuel in advance, as in the case of oil or coal—an adequate and continuous supply is constantly maintained at his service connection. Service to industrial consumers is, of course, subject to the prior demands of the domestic and commercial consumers, at such times and to such extent as the total demand of all consumers exceeds the available supply. These industrial consumers, however, are ready and willing to install standby oil equipment and receive the surplus gas at a low rate when it is available.

Lastly, the prices for gas service charged by the California utilities under state regulation are substantially lower than in other parts of the country. This fact, coupled with the excellent quality of service rendered by the California utilities, makes the use of gas a very attractive and economical feature.

QUANTITY USE OF GAS

During the year 1927 there was sold to domestic and industrial consumers of California by the gas utilities, a total of 95,148,000,000 cubic feet of gas, including natural gas, mixed gas and oil gas. Of this amout, 72,391,000,000 cubic feet, or 76 per cent, was natural gas of approximately 1100 B.t.u. heat content; 620,000,000 cubic feet or 0.7 per cent was mixed gas of 700 B.t.u. quality; and 22,137,000,000 cubic feet or 23.3 per cent was manufactured oil gas having a heat content of 550 B.t.u. per cubic foot.

The following table shows the relation between the quantities of the various kinds of gases and the relation between domestic and industrial sales:

Total Gas Sales—California
YEAR 1927
MCF PER YEAR

Kind of Gas	Domestic & Commercial	Industrial	Total	Per Cent of Total
Nat. Gas	33,785,000	38,606,000	72,391,000	76.0
Mixed Gas	383,000	237,000	620,000	0.7
Oil Gas	18,745,000	3,392,000	22,137,000	23.3
Total	52,913,000	42,235,000	95,148,000	100.0

From the above it will be noted that the domestic and commercial sales comprise 55.5 per cent of the total, while the industrial sales amount to 44.5 per cent.

PEAK MONTH SALES

During the year 1927, the peak month, or the month of heaviest gas demand, was the month of January. During this month the total gas sales amounted to 9,850,200,000 cubic feet, which can be segregated as 7,461,300,000 cubic feet, or 75.7 per cent of natural gas; 59,600,000 cubic feet or 0.6 per cent of mixed gas; and 2,329,300,000 cubic feet, or 23.7 per cent of oil gas. The following table sets forth the relations of these sales:

TOTAL GAS SALES—CALIFORNIA
JANUARY—1927
MCF PER MONTH

Kind of Gas	Domestic & Commercial	Industrial	Total	Per Cent of Total
Natural Gas	4,973,200	2,488,100	7,461,300	75.7
Mixed Gas	42,100	17,500	59,600	0.6
Oil Gas	2,022,500	306,800	2,329,300	23.7
Total	7,037,800	2,812,400	9,850,200	100.0

The relation between the domestic, commercial and industrial sales is different in this case from the yearly figures, due to the fact that it was necessary to materially curtail industrial sales of natural gas in order to meet the domestic and commercial demand. During this peak month the domestic and commercial sales amounted to 71.2 per cent of the total sales, while the industrial sales dropped 28.8 per cent.

SOURCE OF GAS

The manufacture of 550 B.t.u. oil gas in California is a well known process to the readers of this publication and needs no description here.

Reformed gas is manufactured by "cracking" natural gas in straight shot checker brick generators similar to those used in the manufacture of oil gas. This process accomplishes the partial decomposition of the methane and ethane of the natural gas into carbon and hydrogen, increasing the volume of the gas some 25 per cent, and reducing its heating value some 46 per cent. The quality of the reformed gas made may vary from 540 to 750 B.t.u. per cubic foot, depending upon the quality of the natural gas used, the length of the run, temperature of the generator, and the rate of natural gas injection into the generator. This reformed gas is then generally mixed with the necessary amount of natural gas to give the send-out quality required.

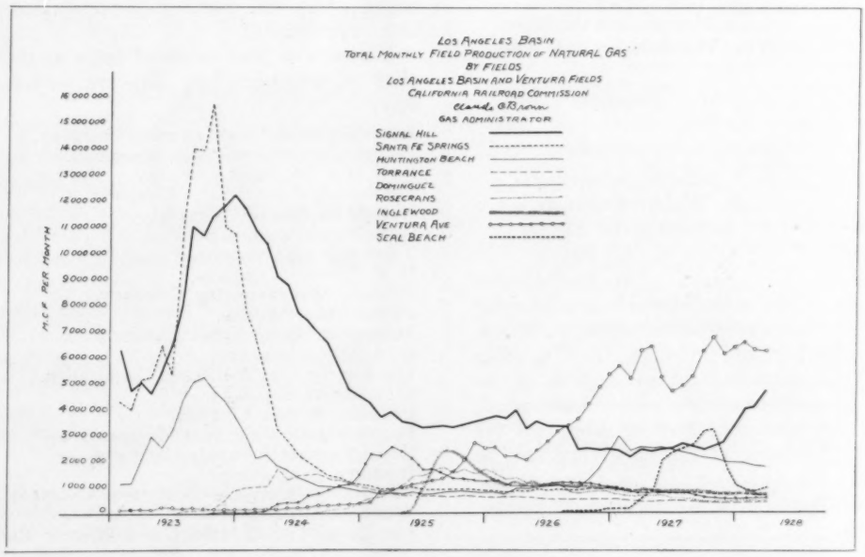
The recent conservation movement has resulted in the pumping of large quantities of surplus natural gas back into the depleted formations for the dual purpose of re-pressuring the oil sands, thereby simulating further oil flow, and also of storing the gas underground for future needs. Notable success has been attained along these lines at Coyote, Dominguez, Brea Canyon, and South Mountain.

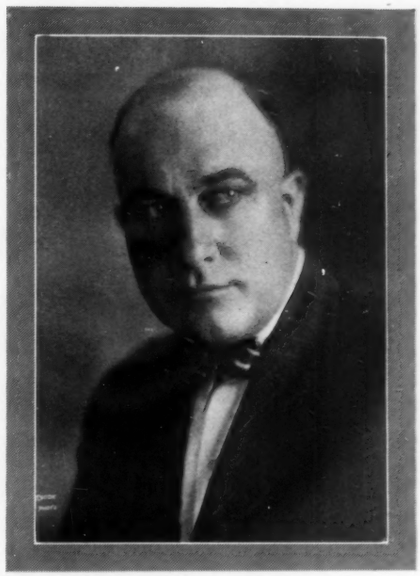
The following table gives the chemical analyses of the natural gases from the various California oil fields, and the chart shows the total monthly field production of natural gas by months from the major fields from January 1, 1923, to date:

	Per Cent by Volume					B.t.u.
Field	CO_2	O_2	CH_4	C_2H_6	N_2	per cu. ft.
Athens	0.7	0.0	84.0	14.8	0.5	1107
Brea-Olinda	0.7	0.4	71.7	26.4	0.8	1188
Dominguez	1.0	0 2	79.5	19.2	0.1	1141
Huntington Beach	3.0	0 0	77.0	19.8	0.2	1124
Inglewood	9.6	0.4	81.7	7.1	1.2	950
Montebello	6.7	0 2	89.4	3.7	0.0	966
Richfield	0.3	0.2	86.0	13.1	0.4	1095
Santa Fe Springs	3.3	0.0	69 8	25.7	1.2	1157
Signal Hill	0.9	0.1	62.5	32.9	3.6	1211
Torrance	3.2	0 1	88.4	8.5	0.0	1042
Ventura	0.0	0.0	83.4	15.6	1.0	1150
Seal Beach	0 3	0.2	72.6	26.3	0.6	1196
Potrero	0.1	0 2	78.2	20.6	0.9	1152
Elk Hills	4.4	0 0	94.6	1.0	0.0	980
Buena Vista	10.6	0.0	80.9	8.9	0.0	1015

The total monthly and the average daily production of natural gas in M.C.F. from these major fields for the month of March, 1928, is given below:

Field	Average Daily Production	Average Number Producing Wells		Total Monthly Production
		Per Well	Total	
Athens Rosecrans	111	89	9 977	309,291
Dominguez	75	163	12,224	379,638
Huntington Beach	557	101	56,298	1,745,239
Inglewood	220	101	22,400	694,000
Santa Fe Springs	316	70	22,315	691,768
Seal Beach	133	217	28,956	897,636
Signal Hill	629	238	150,081	4,652,541
Torrance	640	20	13,055	404,706
Ventura Ave.	110	1,821	200,332	6,210,305
Buena Vista	763	73	55,407	1,717,620
Elk Hills	221	76	16,812	521,193





Claude C. Brown

In the case of the manufacture and distribution of oil gas, the service is limited only by the demand for gas. The oil gas utilities have equipped their plants with adequate holder and generating capacity to meet all reasonable sendout demands with adequate pressure and quality, so that the curtailment of service to any consumer or class of consumers is unnecessary.

In the matter of the collection and distribution of natural gas, the case is different. The utility operator serving natural gas must look for his source of supply to the operations of another industry, namely, the oil industry. If the demand on his system is suddenly increased he cannot rely upon the immediate manufacture of additional quantities of his commodity as can the oil gas operator, but must utilize all of the natural gas that he can obtain to satisfy his consumers' demands according to a priority schedule, domestic and commercial consumers coming first.

Neither has he any control over the quality of his product, the heat value varying widely in the natural gases from different oil fields.

Although the natural gas distributing utilities have large storage installations, which are utilized to the fullest extent, such storage would supply the total load only for a short time. The installation of excessive gas storage is uneconomical, as it costs $75.00 per thousand cubic feet of capacity.

The amount of natural gas available at the oil field to the distributor of this commodity depends entirely upon the drilling campaigns and operations of the oil producer, and is subject to his prior

(Continued on Page 54)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California

A Department Conducted by Clifford Johnstone, Executive Secretary

Set-up Is Complete *for* 35th Annual Convention

WHILE it is still too early to tell all we know about the Thirty-fifth Annual Convention scheduled for Coronado on September 17 to 20 inclusive, we can at least satisfy some of the questions which are put to us daily by telephone, telegraph and mail. Through the courtesy of the management all members of the Association have already received a booklet describing the wonderful Hotel del Coronado which will be our headquarters and under whose roof all meetings will be held. About the middle of August a circular giving rates, and other information will be sent out accompanied by blanks upon which members can send in their hotel reservations, and even more important, gain entry to the famous golf tournament.

Company eliminations are now in progress for the three-minute speaking contests which will again feature the luncheon programs and for the contest among first-aid teams, which has done a great deal during the past year to create interest in first-aid work among gas company employees. Embryo Shakespeares and amateur Thespians in many a plant and office are writing and practicing masterpieces of wit and satire in the hope of convincing the boss that they can win the Addison B. Day Cup for Public Relations Stunts Night supremacy.

BUSINESS PROGRAM

The business program especially will be a delight. Owing to our dropping a day from the customary length of the convention there will be no time to read long reports which are tiresome no matter how much information they contain. The more valuable reports will be printed in September *Western Gas* and should be thoroughly studied before arriving at Coronado, where opportunity will be given to discuss their recommendations. All matters of timely interest in production, distribution and sale of gas will be temptingly served by experts. The Technical Section is planning a comprehensive discussion on the conservation of natural gas and the Commercial Section is prepared to prove that there is not now nor ever can be a fuel to compare with gas for any purpose whatsoever. It will be a lively convention—an informative convention and an inspiring convention. Unless a better arrangement can be found the meetings will be scheduled this way:

MONDAY, SEPTEMBER 17

A.M.—Registration.
P.M.—General Session—President's Address.
Executive Session—Class A and B Members.
Evening—First Aid Contest. Followed by dancing.

TUESDAY, SEPTEMBER 18

A.M.—Technical Section—Production Meeting.
Commercial Section—Industrial Sales.
Accounting Section—Capital Accounts.
Noon—Luncheon Program.
P.M.—Technical Section—Distribution Meeting.
Commercial Section—Domestic Sales.
Accounting Section—Operating Accounts.
Evening—Teamwork for Sales Meeting. Followed by Dancing.

WEDNESDAY, SEPTEMBER 19

A.M.—Technical Section—Natural Gas Meeting.
Commercial Section—Sales Policies.
P.M.—Sports.
Evening—Public Relations Stunts Night—Inspirational Playlets.

THURSDAY, SEPTEMBER 20

A.M.—Technical Section—Operating Meeting.
Public Relations Section—Policies and Practices Affecting the Public.
Noon—Luncheon Program.
P.M.—General Session—Resolutions.
Evening—Banquet—A Big Party.

Nomination of Officers and Directors

IN COMPLIANCE with Article 3, Section 1, of the By-Laws of the Association, the Nominating Committee herewith announces the names of those members whom it will place in nomination at the annual election of officers to be held on the afternoon of September 17, 1928, at Coronado, California.

For President — Carles H. Dickey, San Francisco.
For Vice-President—Frank H. Bivens, Los Angeles.
For Treasurer—D. G. Martin, San Francisco.
For Director—
John Keillor, Vancouver.
H. L. Masser, Los Angeles.
Wm. Moeller, Jr., Los Angeles.
W. M. Thompson, Alhambra.

Respectfully submitted,
F. J. Schafer, Chairman
S. Waldo Coleman
George L. Myers
E. L. Payne
B. S. Pedersen

The submission of names by the Nominating Committee shall not debar any member from making nominations for any and all of the separate offices, which nomination, if seconded, shall be submitted for balloting at the same time and in the same manner as those of the Nominating Committee.

Record Exhibit Will Be Convention Feature

ONE of the interesting features of the Coronado Convention is to be an Appliance and Industrial Exhibit. The Silver Grill, opening off the Casino, has been reserved for this purpose and as the space is limited only Class A and Class B members of the Association will be permitted to place exhibits. D. H. Perkins of the San Diego Consolidated Gas and Electric Company ,who is in charge of the arrangements, informs us that the entire space originally contracted for has already been taken and that he has secured additional room to accommodate late requests.

Those who have reserved space at the time of writing (July 20) are as follows:

James Graham Manufacturing Company.
Wailes, Dove-Hermiston Corporation.
P. H. & F. M. Roots Company.
Everlasting Paint & Sales Company.
George M. Clarke Company.
L. R. Teeple Company.
Tappan Stove Company.
H. R. Basford Company.
Reliance Manufacturing Company.
Pacific Meter Works.
Merco Nordstrom Valve Company.
E. A. Key Company
Los Angeles Gas & Electric Corporation.
Estate Stove Company.
Lattimer Stevens Company
Pacific Manifolding Book Company.
Payne Furnace & Supply Company.
Hammer, Bray Company.
Victor Oxy Acetylene Equipment Company.
Welsbach Company.
San Diego Consolidated Gas & Electric Co.

Panorama of Hotel del Coronado, Coronado Beach, Calif. This will be the rallying point for P.C.G.A. men in September.

Mueller Company.
General Gas Light Company.
Northwest Gas & Electric Equipment Co.
Pittsburgh Equitable Meter Company.
Pittsburgh Pipe and Supply Company.
Sprague Meter Company.
A-B Stove Company.

A Wrist Watch for Three-Minute Speakers

THREE-MINUTE Speakers at the Coronado Convention will rejoice and perhaps work harder when they learn that James M. Rawlins, District Manager of Hill, Hubbell and Company, has interested himself in their efforts. Mr. Rawlins will present a wrist watch to the winner of the final contest on the subject, "What Can the Gas Company Do to Popularize Gas Service." This will be in addition to other prizes. The rules for three-minute speeches are shown on Page 56.

Public Relations Section Stunts Night

TUES. EVENING, SEPT. 18

THE theme for the Stunts Night playlet this year will be the desirability of gas as a home fuel. It is the intention that the desirability of gas as a fuel in the highest class of homes, as well as the more common ones, shall be stressed.

In order to secure the greatest benefit from the presentation of these stunts, it is urged that each company hold a competition among its employees for the best plot around which the stunt might be constructed.

PLAN

Each company willing to participate will provide its own cast, costumes, etc., and have its stunt produced at the time specified.

Consideration of program length dictate that the stunts shall not take longer than 20 minutes each to present.

Addison B. Day, President and General Manager of Los Angeles Gas and Electric Corporation, offers a suitable trophy to the company which presents the winning stunt.

(Continued on Page 56)

FAITH IS THE THING!

CONTRIBUTING to the growth and prosperity of enterprises and industries there are many ingredients. There is money, there is technical skill, there are service, markets, stock certificates and what not. The ingredients which are less often mentioned, but which are nevertheless of prime important are faith, love, pride and sentiment. Lest the growing generation of the gas industry forget these things we are publishing below a letter from W. A. Aldrich, President of the Pacific Coast Gas Association in 1904, now living in retirement in Mineapolis.

July 18, 1928.

Mr. Clifford Johnstone,
San Francisco, California.
Dear Mr. Johnstone:

Thirty-two years ago it was my great privilege and honor to become a member of the Pacific Coast Gas Association. Much water has passed under the bridges during that period.

Your notice giving the date of the next convention of our beloved association reminds me that twenty-four years ago (1904) the high honor of President was conferred upon me. Since which time I have watched its growth to its present wonderful proportions, which has not been equaled in the history of gas associations. And what wonderful developments have taken place since first I became a member! I believe I was among the first to introduce the Humphrey Gas Arc on the Pacific Coast (1895), which at that time was offered in competition with the Electric Arc for store and street lighting. Gas for house lighting has vanished, yet the enterprise and indomitable energy and resourcefulness of our brother gas men have produced such results in heating and for industrial purposes that the loss of its gas lighting is infinitesimal compared to the wonderful present sendout, and today there is no more safe and sound securities than investments in gas companies. And we have only just started on our progressive march to stabilize our product. The severe competition between gas and electricity of thirty-five years ago has practically vanished, and today we know that both gas and electricity have their important functions and although we have hearty competition, gas companies have no further cause for concern; on the contrary, the field for gas activities has broadened and expanded to such an extent that gigantic sums of money are now invested each year in improvements in manufacturing and distribution of appliances in order to keep up with the march of its progress.

Some day, some how, I hope to be permitted to attend just one more convention and to meet once more those of the old guard, and those who have succeeded us in the affairs of the Association. And as I am only seventy-two, can I not look forward to the treat in store for me to revisit the scenes of the good old days when the late J. B. Crockett, John A. Britton, and dear old E. C. Jones (the latter who is still with us) bore the brunt of the burden in forming our grand organization? All honor to them.

Rest assured I shall be with the boys in spirit and my only regret is that I cannot be present in body. I am writing this personal letter to you, Mr. Johnstone, in order to express my appreciation for the courtesies extended to me by your good self.

Very sincerely,
W. A. ALDRICH.

EDITORIAL

P. C. G. A. Convention Material to Be of High Order

FROM every indication the near-at-hand convention of the Pacific Coast Gas Association is going to be strictly up to standard. Nothing stronger need be said, for in its past thirty-four annual sessions the Coast organization has set up a mark of attainment that few similar groups can boast. This year will be no exception, for there is important committee work to be reviewed at Coronado, the convention site, and the program of general sessions will be of its usual stimulating and worthwhile character.

Much of the meat of the convention program lies in thorough discussion of the committee reports submitted, and for this reason much convention material will be given advance publication in the September issue of *Western Gas*. Copies of this special number will be in the hands of Association members in ample time to allow them to scan the papers and reports which it will contain, and to come to Coronado prepared to contribute something in discussion of recommendations made by Association committees.

Some of the committee contributions this year are of exceptional merit, which should make the 1928 P. C. G. A. Proceedings a big contribution to the science of the industry. *Western Gas* deems it a privilege to offer a large part of this material to its readers in September, and we bespeak a careful reading of this issue on the part of P. C. G. A. members and non-members alike. There will be something of value in this number for everyone in the gas and related industries.

Convention dates this year are September 17 to 20, and the combination of Association sessions and San Diego's attractions will bring a good number of West Coast men to Hotel del Coronado headquarters in time for registration. All available exhibit space has been taken by P. C. G. A. manufacturer members, and their displays will be an additional attraction.

Tributes to Natural Gas Investments

IN an article titled "Romance of Natural Gas" a staff member of the "Coast Investor & Industrial Review" puts that western financial journal emphatically on record, in its July, 1928 issue, favoring investment in natural gas securities.

All of the evidence long familiar to the industry is brought out for the layman investor's eye. Some of the facts considered pertinent from the investor's angle, as pointed out in the above-mentioned article, are:

That natural gas as a domestic fuel has no superior.

That, as in the case of manufactured gas, the natural gas industry is an absolute utility, not subject to periodic waves of depression.

That natural gas is gaining industrial load daily, by virtue of its high heat content, cleanliness, and other advantages inherent in the character of the fuel.

That no other utility approaches the earning records of natural gas companies, the great majority of natural gas bonds being self-liquidating.

That the tendency toward consolidation of smaller properties into larger, noticeable in this industry as in others, is bringing the security which lies in greater financial resources and scientific management.

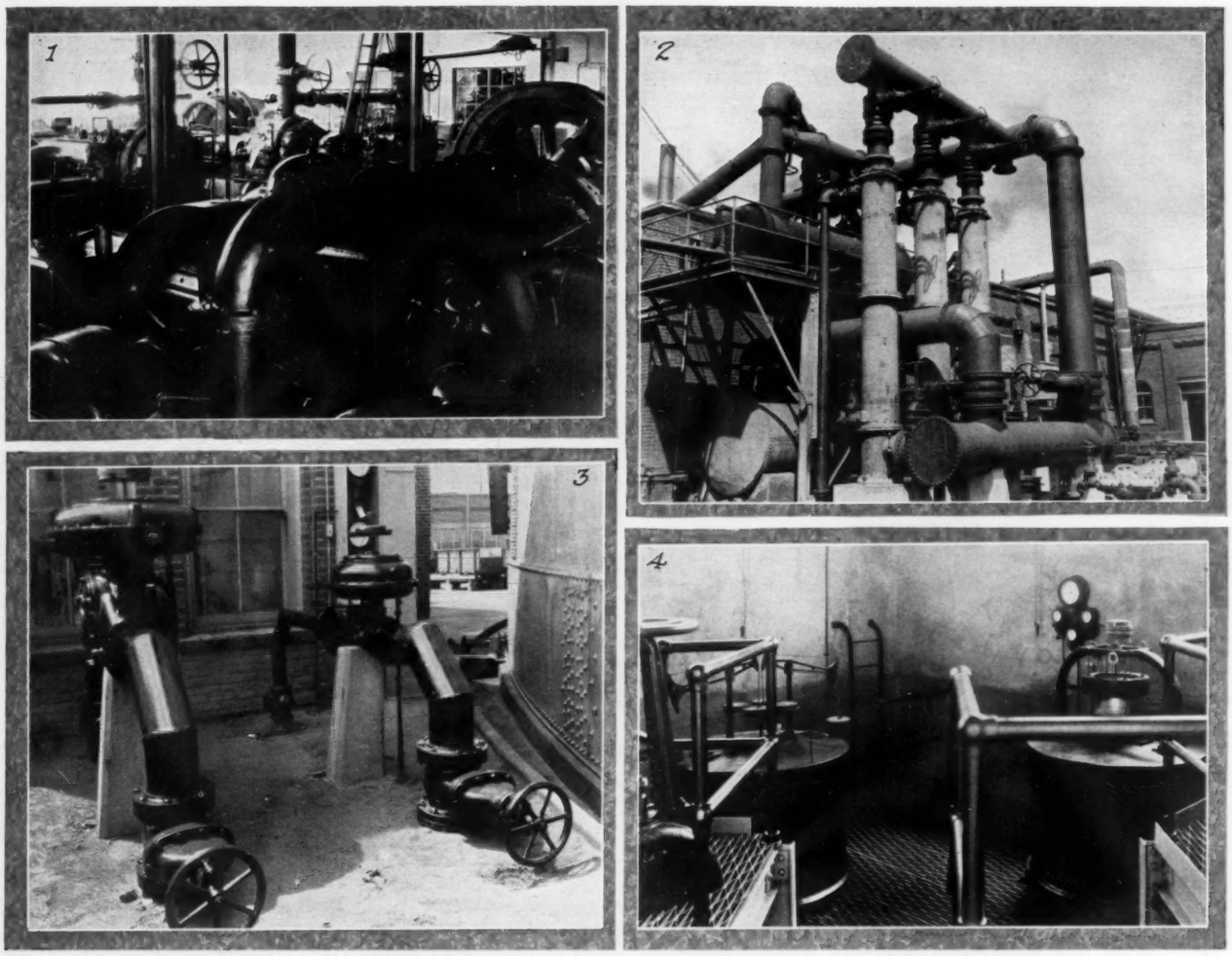
That the past two years have witnessed an amazing expansion in natural gas activity, as seen in the record of outstanding bonds: of $157,000,000 now outstanding, $138,000,000 were issued in 1926 and 1927.

The article in question, acclaiming natural gas as "America's fastest growing utility"—already a $1,575,000,000 industry—in no uncertain terms recommends securities in this field to the attention of the conservative investor.

Such tributes to the progress made by natural gas enterprises are music in the ears of those who know the story of obstacles overcome, of hazards met and conquered, which lies behind the optimistic present.

Taking the Sales Responsibility on Refrigeration

NOW that gas refrigeration has proved itself as a technical achievement, and since the difficulties of getting a new item on commercial production in a measure have been ironed out, the responsibility for carrying on has been thrown squarely up to the commercial man. And wherever hard and intelligent selling is being done on gas refrigeration, it is "paying out." One western company is finding the high class residential hotel a live prospect, as reported elsewhere in this issue. Another commercial department expects to exceed its summer refrigeration quota long before the season expires. There is no doubt that a good merchandising program will sell gas refrigeration in the face of all competition.



1. Compressor station, San Diego Consolidated Gas and Electric Company. 2. Gas Coolers. 3. Regulator station. 4. Large regulator at No. 4 holder station of San Diego company

Waterless Gas *in* San Diego

By J. A. HARRITT

*Superintendent Gas Production, San Diego Consolidated Gas and Electric Company**

FOR the past several years the San Diego Consolidated Gas and Electric Company has been studying the problem of interior corrosion in gas systems to the end that preventive measures on a commercial scale could be inaugurated.

The removal from gas of most of the oil vapors (incident to the change of gas standards from illuminating value to B.t.u. value) has resulted in a corresponding increase in the amount of water vapors carried. It has further resulted in the removal of the protecting oil film from the interior of distributing systems, allowing the corrosive elements to attack the metal parts. Upon condensation, by decreased pressure and temperature, these water vapors which are harmless in themselves condense to liquid water, thus accelerating the action of the corrosive elements and causing rapid deterioration of pipe lines and meters. There is also an accumulation of large quantities of "dust," where dry, and of "mud," where wet. This material is about 40 per cent metal from the interior of the piping.

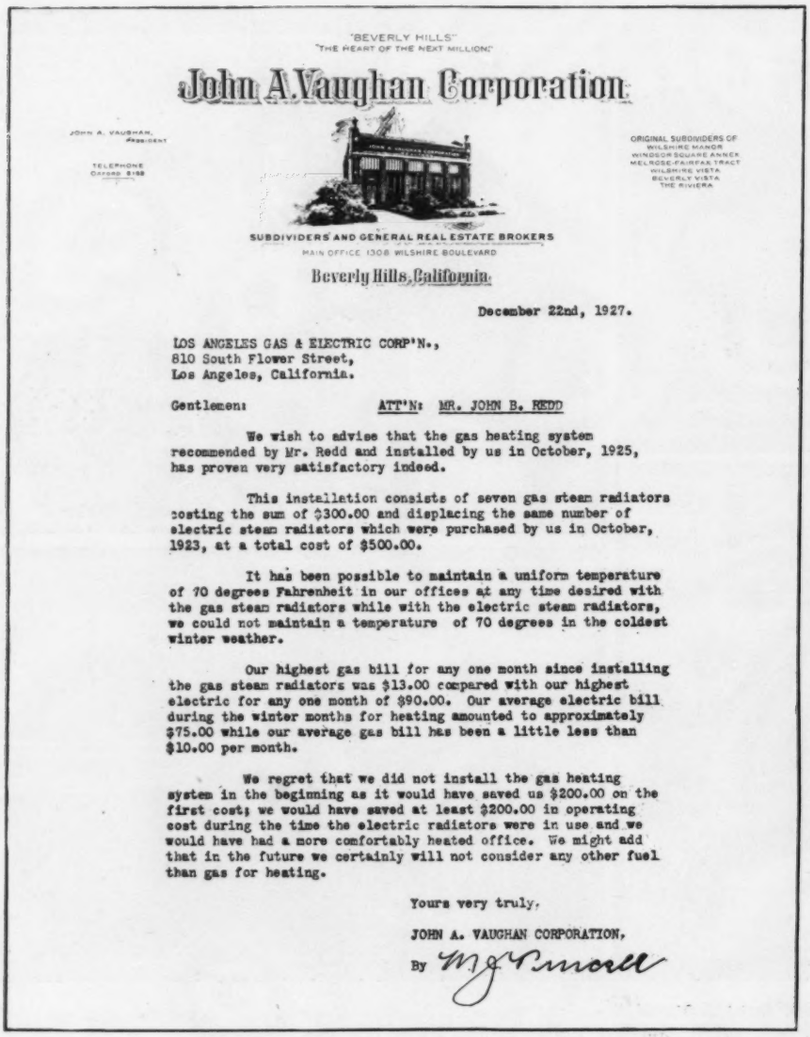
In our research as to the cause of corrosion, the disturbing elements in the gas were studied to see how far they could be eliminated, commercially. This proved entirely unfeasible, and as some of these elements are desirable in the gas and as none are deleterious to the consumer, the idea of partial elimination was abandoned.

We soon proved that none of the corrosive elements are injurious to any appreciable extent when dry. Thus the simplest remedy is to remove the water from the system by removing from the gas all those water vapors that would eventually form liquid water by condensation.

After long continued laboratory and semi-commercial tests on various known and original methods of dehydration of gases, we determined that the method best suited to our local conditions was that of compressing the gas to high pressures, with a corresponding high temperature (due to compression) and a subsequent rapid cooling of the gas. This rapid cooling of the gas while still compressed forces the gas to give up its water vapors to such an extent that none can condense out when the gas is re-

(Continued on Page 51)

*Excerpts from the News-Meter, journal of the San Diego Consolidated Gas and Electric Company, for June, 1928. Cuts courtesy of the News-Meter.



"BEVERLY HILLS"
"THE HEART OF THE NEXT MILLION"

John A. Vaughan Corporation

JOHN A. VAUGHAN, PRESIDENT

TELEPHONE

ORIGINAL SUBDIVIDERS OF
WILSHIRE MANOR
WINDSOR SQUARE ANNEX
MELROSE-FAIRFAX TRACT
WILSHIRE VISTA
BEVERLY VISTA
THE RIVIERA

SUBDIVIDERS AND GENERAL REAL ESTATE BROKERS
MAIN OFFICE 1308 WILSHIRE BOULEVARD
Beverly Hills, California

December 22nd, 1927.

LOS ANGELES GAS & ELECTRIC CORP'N.,
810 South Flower Street,
Los Angeles, California.

Gentlemen: ATT'N: MR. JOHN B. REDD

We wish to advise that the gas heating system recommended by Mr. Redd and installed by us in October, 1925, has proven very satisfactory indeed.

This installation consists of seven gas steam radiators costing the sum of $300.00 and displacing the same number of electric steam radiators which were purchased by us in October, 1923, at a total cost of $500.00.

It has been possible to maintain a uniform temperature of 70 degrees Fahrenheit in our offices at any time desired with the gas steam radiators while with the electric steam radiators, we could not maintain a temperature of 70 degrees in the coldest winter weather.

Our highest gas bill for any one month since installing the gas steam radiators was $13.00 compared with our highest electric for any one month of $90.00. Our average electric bill during the winter months for heating amounted to approximately $75.00 while our average gas bill has been a little less than $10.00 per month.

We regret that we did not install the gas heating system in the beginning as it would have saved us $200.00 on the first cost; we would have saved at least $200.00 in operating cost during the time the electric radiators were in use and we would have had a more comfortably heated office. We might add that in the future we certainly will not consider any other fuel than gas for heating.

Yours very truly,

JOHN A. VAUGHAN CORPORATION,

By M J Rinaldi

LEFT: Facsimile of a letter addressed to the Los Angeles Gas and Electric Corporation by a former user of electric heating, the letter being written after two years' experience with gas heat!

Facts Controvert Fancies *when* It Comes *to* Heating

By JOHN B. REDD

Los Angeles Gas and Electric Corporation

THERE seems to be a tendency upon the part of some electric heating appliance salesmen to deal in generalities rather than in facts when offering their goods for sale, and especially is this true when they are talking operating costs.

The accompanying letter very clearly demonstrates a case of this kind and in no uncertain terms sets forth just why this customer will always be a booster for gas and opposed to electric heating.

This customer stated to the writer that when he purchased the electric system referred to in his letter he believed that he was buying the best heating system available and was convinced that the operating cost would not exceed that of a first class gas heating system. He paid little attention to figures which were presented to him at the time of placing the order for the electric radiators, but stated that the electric salesman talked so convincingly about service, satisfaction and cheap operating cost that he was satisfied in his own mind that he would make a mistake if he bought any other heating system than the particular one offered by this salesman.

The electricity for heating was purchased on a low power rate and the current was measured through the same meter supplying an electric sign, the rate being based on a sliding scale which averaged approximately 2c per K.W.H. with a minimum charge of $20 per month, which was the approximate cost of operating the electric sign. The gas now being used for the heating system is purchased at a rate of approximately 87c per 1000 cubic feet. At these rates the consumer would actually pay $82.20 for 4000 K.W.H., while the equivalent heat of 1100 B.t.u. gas is now purchased for the sum of $13.44. These figures are given to prove the accuracy of the actual cost of operation of the two systems as set forth in paragraph four of the customer's letter, in which he says "the highest gas bill for any one month since installing the gas steam radiators was $13.00, compared with the highest electric for any one month of $90.00"—and to further substantiate the correctness of the figures, it should be noted that the average monthly electric bill for heating this office was $75.00, while the average gas bill since installing the gas steam radiators has been approximately $10.00 per month.

At the prevailing electric rates 3400 K.W.H. would cost $75.00 per month while the equivalent heat of 1100 B.t.u. gas at 87c per 1000 cubic feet is now being purchased for $11.49, these figures being based on 100 per cent efficiency for the electricity and 80 per cent efficiency for the gas which is consumed in the gas steam radiators connected in the offices.

NO UPKEEP COSTS WITH GAS

It will be noted that the gas installation was made in October, 1925, and the date of the customer's letter is December 22, 1927, and that during this time not one penny has been paid in unkeep or repairs to the gas steam radiators. However, the item of upkeep and repairs to the electric steam radiators was one to be given serious consideration as it was necessary to replace heating elements at least once in each radiator during the time the electric system was in use. This caused considerable annoyance to the consumer as naturally the only time the element burned out would be when the radiators were in service and when needed to heat the offices. In checking over the item of repairs for the electric radiators it was found that this averaged about $30.00 per year from the time they were installed to the time of their removal.

(Continued on Page 51)

The New Rex-Patrol *Automatic* Water Heater

Patent Pending

FULFILLS your requirements to dominate water heater sales in your territory. It has all the features of value combined in other water heaters in addition to exclusive features that cannot be found in any other tank water heater:

Self-acting in every respect. It requires no attention from the owner.

Patrol Valve equipped. An assurance of safety should the pilot light go out.

Economical in operation. Rex blue-flame burner assures complete combustion of all gas used.

It is dependable. The owner is sure of continuous hot water service.

No accessories required to make this water heater automatic.

By a wide margin the lowest priced automatic water heater built.

Write us about the franchise in your territory and our offer for a demonstration.

© 1928 The Cleveland Heater Co.

THE CLEVELAND HEATER CO
1900 W. 112th St. Cleveland, Ohio

SPEE DEE
TRADE MARK REGISTERED
BOILER

New
Engineering Discoveries *give Amazing Results*

THE efforts of Rex engineers have been rewarded by results that water heating engineers now recognize as the most important and far-reaching contribution of the year to the water heater industry.

The internal riser and the shorter and more compact construction of the 24-gallon Spee-Dee Boiler lowers radiation loss and furnishes more useable hot water than the 30-gallon standard range boiler.

In addition it delivers useable hot water quicker than the ordinary range boiler. It is the last word in hot water equipment, the simplest and most economical hot water storage tank.

Act today—if you are interested in the biggest opportunity which has been offered in years. With the Spee-Dee Franchise you will be able to satisfy both the higher price and the moderate price buyer and that means more sales.

© 1928 The Cleveland Heater Co.

THE CLEVELAND HEATER CO
1900 W. 112th St. Cleveland, Ohio

Large *and* Small Bakeries *as an* Attractive Gas Market

By S. L. DRUMM
Industrial Gas Engineer
*New Orleans Public Service, Inc.**

THERE is no question of doubt that baking was one of the earliest of all industrial enterprises. This very fact has hampered the modernization of this industry more than anything else, for its methods have become traditions and are handed down from father to son. It is an interesting fact to know that the oldest book in existence—the Egyptian Book, "Book of the Dead" refers to the baking of bread and cakes. However, this barrier is gradually being torn down and the more progressive bakers are reaching out for the newest and the best.

Bake-ovens may be divided into three general classifications, as to methods of firing, as follows:

1. Direct-fired:
   (a) Single door for fuel and food.
   (b) Separate door for fuel and food.
2. Semi-indirect-fired:
   (a) Separate combustion chamber; products of combustion pass up through baking chamber.
3. Indirect-fired:
   (a) Separate combustion chamber; products of combustion do not pass through the baking chamber.

Under the first classification are found the old 'Dutch' type peel ovens. This type of oven is fired intermittently and uses solid fuel, i.e., wood or coal.

Under the second and third classifications are found practically all the modern ovens using both solid and gaseous fuel. These ovens are continuously fired.

However, in order to carry out the original purpose of this paper, (i.e., to arouse a desire to get hold of the bread-baking business for the gas company) a further classification is given as follows:

1. Large Bakeries:
   (a) Wholesalers
2. Medium-sized Bakeries:
   (a) Suburban Shops.
   (b) Retailers and Wholesalers.
3. Small Bakeries:
   (a) Cake Bakeries.
   (b) Pie Bakeries.
   (c) Restaurants, Clubs, Hotels, etc.

The large bakeries, which as shown under Classification 1, include the wholesalers and present the most desirable field for increased gas consumption. The large scale on which they operate permits the use of large traveling ovens, which are of the continuously fired type.

S. L. Drumm

These large traveling ovens are usually about 9 feet wide and from 50 feet to 125 feet long. Due to the close temperature regulation which is necessary in this type of oven, gas is the ideal fuel. It is true that the first cost is high, but when quantity production is considered, this first cost is more than offset. A specific case to which I would like to refer is a large wholesale bakery in New Orleans, formerly requiring the use of five Durkorph ovens which were replaced by a large traveling oven of a well-known make. The operating data are not available for publication, but suffice it to say that this operator is more than delighted with the change and is ready and willing to recommend it to anyone so interested.

This investment was in the neighborhood of $65,000 and the cost of the gas (600 B.t.u.) 80.6c net per M.C.F. It is interesting to note that the savings in labor alone amounted to approximately $7,500 per year.

If we now view this business from the gas company's viewpoint, it can readily be seen that this wholesale bakery business has a large potential gas sales volume due to the growth and consolidation of bakeries, rather than the continuance of small individual shops. Competition from electricity, coal and oil need not be feared if more ovens of this type come into use.

Under Classification No. 2, medium-sized bakeries, will be found many of the old 'Dutch' Type peel ovens, as well as many patent ovens of the indirect continuous fired type. This is probably the most difficult class of bakeries for the industrial man to sell.

The operators of these medium-sized bakeries are not, as a rule, in a position to make a large expenditure for more modern bake ovens of the rotary or reel type and they are also reluctant about baking hearth breads on any oven other than the brick oven. The only other recourse is to convert these ovens to gas. The procedure to follow in converting this type of oven to gas is briefly, as follows:

Cover the grate with asbestos board and on top of the asbestos board put a layer of fire brick. In the center of this covered grate are then placed special fire brick balls, or just broken fire brick. The burner nozzle is so located that the flame will impinge directly on the balls, and as the balls become hot, they radiate the heat the same as does a bright coal fire. One point to bear in mind is to see that there are no obstructions to the radiant bed. A check of this is possible by seeing that the entire oven is lighted up by the fire and there are no shadows. The procedure in heating up is the same with coal, i.e., the oven is fired for an hour or longer, the flame then extinguished and burner removed (where swivel connection is made) and oven allowed to "set" or "soak" to the correct temperature for baking.

More complete detailed data for converting such ovens to gas is given in a most clear and concise form in the American Gas Association's Booklet—"Bakeries, Hotels and Restaurants," prepared under the direction of the Industrial Gas Section of the American Gas Association. Every industrial gas salesman should have a copy of this booklet, as it will prove invaluable in helping him obtain some of the bakery business in his community.

SMALL BAKERIES

Under the third classification, the small bakeries, will be found all the little neighborhood shops that bake pies, cakes and confections, as well as the hotels, clubs and restaurants, which bake for their own use. The securing of this business offers very little difficulty, although it is in this particular class that competition from the electric bake oven is usually encountered. However, the portable deck type gas oven possesses every advantage that might be ascribed to the electric oven, and in addition, a cost of operation that is considerably lower than with electricity at the prevailing rates.

It is well to note, at this point, that there are three types of electric bread-baking ovens on the market; namely:

(1) Sectional or deck oven.
(2) Reel oven.
(3) Continuous conveyor type.

(Continued on Page 50)

*Delivered at the 1928 annual convention of the Southern Gas Association.

Water Heater Campaigns Hold Sales Interest *on* West Coast

By GEORGE H. FINLEY

As a desirable load builder the automatic gas water heater is rightly receiving increasing attention in the sales plans of commercial departments. At the present time two western companies have water heater campaigns in progress which merit a description, not only because of interest which attaches to their scheme of organization but also because a feature of both of them is a prize trip to the Coronado convention of the Pacific Coast Gas Association in September for the winning salesman. This device is a highly commendable one from the Association viewpoint as it builds interest in convention sessions; and its use is a tribute, too, to the value of convention proceedings for the commercial man.

An 11-week direct selling effort on four makes of automatic gas water heaters is being conducted by the Pacific Gas and Electric Company in all of its divisions except San Francisco and the East Bay, and sales to employees of the company are being made all over the system including the two divisions mentioned. The campaign covers June 17 to September 1. The Southern Counties has under way a 13-week campaign on automatic storage water heaters, terminating September 8. Between them these two gas systems include well over a hundred communities in Northern and Southern California.

Giving first some details in the set-up of the P. G. and E. campaign, there are a number of aspects which will interest other sales departments. An unusual effort has been made to gain the cooperation of every employee not on the sales force, $2.50 being paid for each sales lead subsequently closed by salesmen. Special prizes of $50, $25, and $10 have been set for employees turning in the three highest numbers of consumer prospects sold during the campaign dates.

To encourage employees to purchase automatic heaters for their own use the company has made a 25 per cent discount from the terms list price, and a series of seven broadsides, numbering 10,000 in all, was sent to employees.

Special windshield stickers and cloth banners for use on company cars and trucks help to develop inquiries on the campaign from the public.

Advertising run in newspapers and consumer broadsides mailed during the campaign were produced in the company's sales department, and a close tie-in has been effected between the broadsides and mailing bill inserts sent consumers. Illustrations playing up hot water use by all members of the household run on both types of copy. It should be added that P. G. and E. advertising has featured hot water rather than any one make of heater, it being left to the individual division of the company to stress any one or more of the four lines carried in the campaign.

PREMIUM OFFER

A dishwasher outfit, known as a Three-in-One and consisting of a hose to be attached to hot water faucet, a glass jar, brush, and drying rack, is used as a special premium offer to both consumers and employees during the campaign, the dishwashers being mailed direct to the purchasers. This premium, says the P. G. and E., is one that actually works, giving salesmen a selling aid that coordinates closely with the automatic hot water system idea.

"Easy monthly payments" are advertised as sales inducement, with $5.00 down and payments being allowed to extend over 18 months where 12-month terms are not satisfactory.

Another item in the P. G. and E. campaign is a plumbing trade tie-in. Any plumber selling one of our four lines featured, who will make a special window trim or displays for the campaign is made this cooperative offer: The gas company furnishes him, for dispay or demonstration, one of the dishwasher premium outfits, and mails one of the outfits to each of the plumber's retail customers sold during the campaign.

A quota of 1000 heaters has been set for the 11-week drive, this figure not including sales to employees in San Francisco or East Bay, nor does it include plumber sales over the system.

To build and retain interest in the campaign a special bulletin called the "Hot Watergram" is issued weekly, going to all departments, key men in the company, to foremen and to the sales crew. Another flourish which is proving valuable is the dope sheet reproduced with this article. It will be noted that this gives the standing of every sales crew member week by week, and indicates the total number of heaters sold by each, as well as the percentage of division quota sold at the end of each week and the percentage of quota attained for the system. These dope sheets in letterhead size go out with the "Hot Watergram," and a master sheet four times the usual size is posted on the general bulletin board in each division, with the weekly copy of the sales bulletin.

A series of several special window trims at company offices is prepared during the campaign, with water heater companies cooperating in supplying display material.

Suitable prizes are arranged for the best window trim.

A prize goes to the division selling the highest percentage of its quota in direct sales, and a similar prize goes either to the San Francisco or East Bay division, depending upon which turns in the greater number of employee sales.

SALESMEN'S PRIZES

To the salesman attaining the greatest number of individual sales is awarded a grand prize of one week's vacation with salary and a trip at company expense to the P. C. G. A. convention at Coronado.

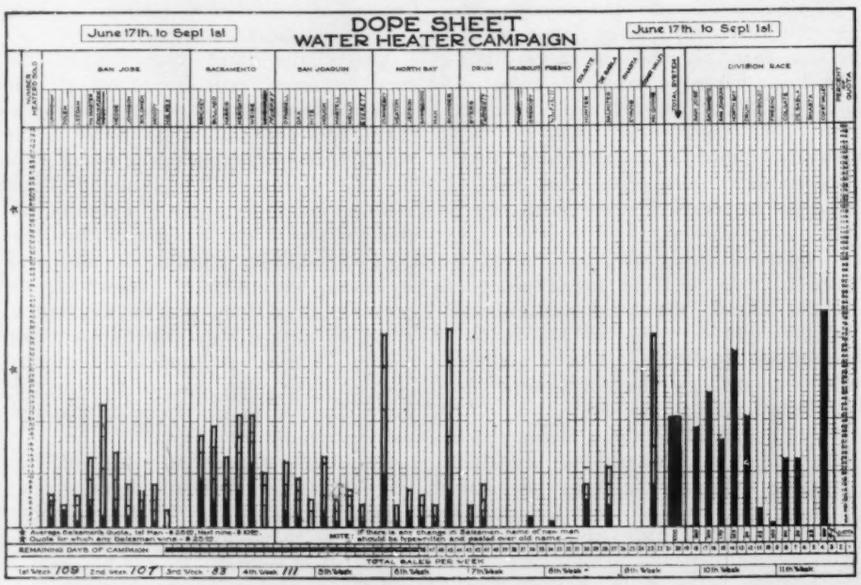
In addition to the grand prize there are bonus prizes, based on an individual average quota of 30 automatics, as follows: $25 to the salesman first attaining this quota; $10 to each of the next nine making their individual quotas; $25 to any salesman selling 60 or more automatics.

Weekly bonuses of $2 on each automatic above a minimum of three are provided for each salesman.

Special feature prizes are being offered for the last month of the campaign, based upon the merchandise value sold during the final period and giving all salesmen an equal start.

Results of the P. G. and E. effort to date have been highly gratifying, and in a good measure this is attributed to the company's policy of selling the idea of automatic hot water systems rather than any single make

(Continued on Page 40)



Dope sheet used in P. G. and E. water heater campaign

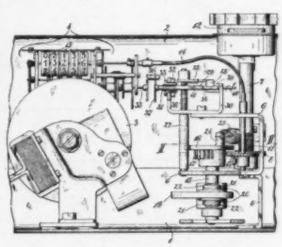
THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,674,374. GAS COMPRESSOR STEPHANIE IMHOFF-PAPÁČKOVÁ, Basel, Switzerland. Filed Apr. 11, 1927 Serial No. 182,819, and in Switzerland Apr. 23, 1926 1 Claim. (Cl. 230—192.)

In a high speed valveless balanced piston compressor, the combination of two coaxial cylinders, two oppositely-reciprocating pistons therein, two sets of ports in each piston axially spaced apart at a distance equal to the piston stroke, two conducting channels in each piston and relatively displaced both circumferentially and axially, said channels having their outlets at the piston circumference axially at a distance apart equal to the piston stroke and communicating, the one, with the cylinder space over the piston and the other with the cylinder space under the piston, the whole structure

being such that in the outer dead point position the one piston channel permits the compressed gas in the outer cylinder space to flow out through the corresponding cylinder ports, and in the inner dead point position the other piston channel permits the compressed air in the inner cylinder space to flow out through the corresponding cylinder ports.

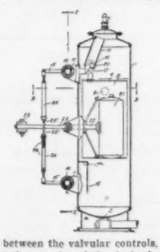
1,670,592. PREPAYMENT METER FOR GAS, WATER, ELECTRICITY, OR SIMILAR SUPPLY. JOSEF MERTLER, Zug, Switzerland, assignor to the Firm Landis & Gyr Ltd., Zug, Switzerland. Filed Apr. 6, 1922, Serial No. 550,141, and in Switzerland Apr. 12, 1922. 4 Claims. (Cl. 235—132.)



1. A device on prepayment meters for gas, water, electricity, or similar supply, having an axially moving spindle, provided with a sloping face, a tripping mechanism controlling the supply, this spindle having a sloping face which latter, when the spindle is displaced, releases part of the tripping mechanism and thereby causes the whole tripping mechanism to be released.

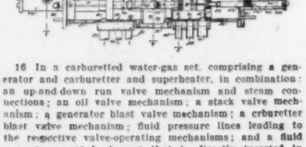
1,670,728. OIL AND GAS SEPARATOR. DAVID G. LORRAINE, Los Angeles, Calif. Filed June 3, 1925 Serial No. 34,583. 11 Claims. (Cl. 183—2.7.)

1. A device of the character described comprising a settling chamber, a gas chamber, valvular controls spaced above one another at the exterior of the device for direct communication with the gas chamber and settling chamber respectively, actuating means controlled by the level of a float relative to the device and projecting to the exterior



of the device between the valvular controls, and operating connections at the exterior of the device between said actuating means and the respective valvular controls.

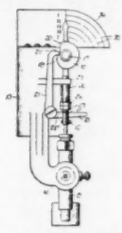
1,671,093. GAS-MAKING APPARATUS. THOMAS W STONE, Fort Wayne, Ind., assignor to Western Gas Construction Company, Fort Wayne, Ind., a Corporation of Indiana. Filed Aug. 5, 1921. Serial No. 490,088. 21 Claims. (Cl. 48—83.)



16. In a carburetted water-gas set, comprising a generator and carburetter and superheater, in combination: an up-and-down run valve mechanism and steam connections; an oil valve mechanism; a stack valve mechanism; a generator blast valve mechanism; a carburetter blast valve mechanism; fluid pressure lines leading to the respective valve-operating mechanisms; and a fluid pressure operated element that is directly inserted in the flow-path to said lines and that itself intercepts all said fluid pressure lines and that is movable relative to all of them for determining the sequence in which said fluid pressure lines receive fluid and that is reversely operable for effecting the operation of said valve mechanisms in the above named sequence and in the reverse sequence; substantially as specified.

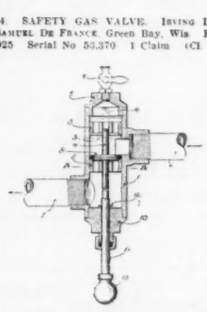
1,672,500. FLOW-CONTROL MEANS. GEORGE L. REICHHELM, Elizabeth, N. J., assignor to The Gasifier Company, Elizabeth, N. J., a Corporation of New Jersey. Filed June 20, 1925 Serial No. 38,470 4 Claims. (Cl. 137—78.)

1. Control means including a fluid conduit, a valve for controlling said conduit, a second fluid conduit, means including a cam responsive to the pressure of the fluid within said second conduit, and means responsive to the movement of said cam for controlling said valve, said cam being provided with an abutment portion adapted to cooperate with said controlling means to prevent the opening of said valve by said means,



and means for tripping said controlling means out of operative relationship with said abutment portion.

1,672,504. SAFETY GAS VALVE. IRVING L. SAUVET and SAMUEL DE FRANCE, Green Bay, Wis. Filed Aug 29 1925 Serial No 53,370 1 Claim (Cl. 67—115.)

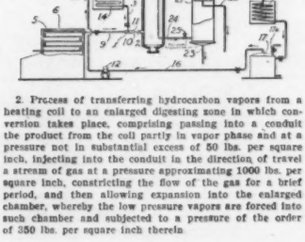


A safety gas valve comprising a cylinder open at both ends, said cylinder being provided with an upper cap equipped with a pet cock and a lower head, a manually slidable rod passing through said lower head, a pair of separate valve seats positioned within said cylinder in spaced relation, said valve seats being removable from said cylinder, means for locking said valve seats in position, said cylinder having an entrance aperture between said valve seats and having an outlet aperture below the lower of said valve seats, said valve seats being apertured hubs, and a double faced valve adapted to cooperate with either of said seats and having a spindle freely guided by said hubs, the lower end of said spindle being adapted to abut the upper end of said rod when said rod is forced upwardly.

1,668,488. GAS-VENT T. EDWARD W. N. BOOSEY, Detroit, Mich. Filed May 1, 1925. Serial No. 27,885. 3 Claims. (Cl. 137—75.)

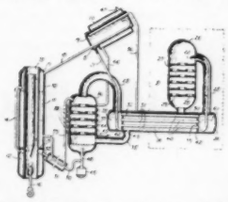
1. A gas vent T comprising a cylindrical body member positioned on its vertical axis, the lower end thereof having a drain opening and its upper end being adapted for connection with a stack, said body member having a side opening provided with an interiorly tapered flange to receive a vent flue and form a tight joint therewith, an arcuate rib at the upper side of the opening having its inner face coextensive with the inner face of the wall of the body member, the said rib extending inwardly of the flange to a distance greater than the thickness of the vent flue, the wall of the flange opposite the arcuate rib being connected with the body member by a curved portion adapted to contact the flue at a point beyond the end of the flue, the said rib providing a means to prevent moisture collecting in the body member on the flange side from passing into the vent flue.

1,659,948. PROCESS OF TRANSFERRING GASES AND VAPORS. GEORGE E. FOX, Elizabeth, N. J., assignor to Standard Oil Development Company, a Corporation of Delaware. Filed Dec. 9, 1925 Serial No. 74,256. 2 Claims. (Cl. 196—58.)



2. Process of transferring hydrocarbon vapors from a heating coil to an enlarged digesting zone in which conversion takes place, comprising passing into a conduit the product from the coil partly in vapor phase and at a pressure not in substantial excess of 50 lbs. per square inch, injecting into the conduit in the direction of travel a stream of gas at a pressure approximating 1000 lbs. per square inch, constricting the flow of the gas for a brief period, and then allowing expansion into the enlarged chamber, whereby the low pressure vapors are forced into such chamber and subjected to a pressure of the order of 350 lbs. per square inch therein.

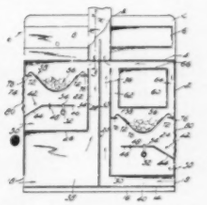
1,672,265. REFRIGERATION ALVAR LENNING, Brooklyn, N. Y., assignor to Electrolux Servel Corporation, New York, N. Y., a Corporation of Delaware. Filed Jan. 22, 1927. Serial No. 162,921, and in Germany July 31, 1926. 15 Claims. (Cl. 62—119.)



1. In a refrigerating apparatus, the combination with a device for liquefying a refrigerant, an evaporator and a conduit for conducting the liquefied refrigerant from said device to said evaporator of a wick within said conduit.

5. In an absorption refrigerating apparatus, in combination, a generator, an absorber, a heat exchanger, means to circulate a gas through said absorber, conduits connecting different spaces of said heat exchanger with said generator, a coil wound around said absorber for circulation of cooling liquid, a conduit connecting the bottom of the absorber with one space of said heat exchanger and a conduit connecting the other space of said heat exchanger with the top of said absorber, the last mentioned conduit extending vertically and contacting with a plurality of convolutions of said coil and a fused metal connection between the upwardly extending conduit and said convolutions.

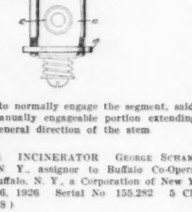
1,671,518. COMBINED GAS HEATER AND COOK STOVE. CHARLES E. C. EDEY, Los Angeles, Calif. Filed May 13, 1927. Serial No. 191,045. 4 Claims. (Cl. 126—4.)



1. A heater comprising a casing, a central vertical dividing partition therein walls spaced from each side of said partition to form flues and defining combustion chambers, said flues opening through the casing below said chambers, an oven directly above one chamber, and a cooking top above the other chamber and the oven.

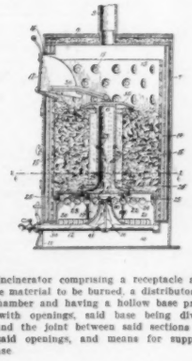
1,671,594. GAS-VALVE LOCK. CLARENCE E. KOHLMANN, San Francisco, Calif. Filed Mar 23, 1927. Serial No. 177,571. 3 Claims. (Cl. 251—166.)

1. A device adapted to be detachably secured to a gas petcock, the petcock having a body, a plug rotatable in the body and having an external stem, and a laterally extending handle secured to the stem, said device comprising a toothed segment adapted to be detachably secured to the body, a member adapted to be detachably secured to the stem, said member having a portion adapted to be clamped between the handle and the stem, and a locking pawl pivotally secured to said member and



adapted to normally engage the segment, said pawl having a manually engageable portion extending upwardly in the general direction of the stem.

1,674,304. INCINERATOR. GEORGE SCHAMBERG, Buffalo, N. Y., assignor to Buffalo Co-Operative Stove Co., Buffalo, N. Y., a Corporation of New York. Filed Dec. 16, 1926. Serial No. 155,282. 5 Claims. (Cl. 110—18.)



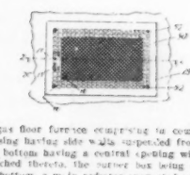
1. An incinerator comprising a receptacle adapted to receive the material to be burned, a distributor arranged in said chamber and having a hollow base provided on its side with openings, said base being divided into sections and the joint between said sections extending through said openings, and means for supplying gas to said base.

1,671,618. GAS-BURNING STOVE. ALBERT EDGERTON THATCHER, Fenton, Mich., assignor to Fenton Machine Tool and Die Co., Fenton, Mich., a Corporation of Michigan. Filed Aug. 27, 1926. Serial No. 131,535. 6 Claims. (Cl. 158—59.)

1. In a stove of the character described having a liquid fuel reservoir and a plurality of burners, a fuel gas distributor positioned substantially equidistant from each of the several burners comprising an upper chamber communicating with the reservoir to receive fuel therefrom after the same has been mixed with air and a lower barber communicating with the upper barber through

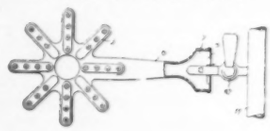
a restricted passageway and having a plurality of substantially equidistant fuel outlets, one leading to each burner and a cone shaped deflector extending upwardly from the lower chamber through said restricted passageway into the upper chamber.

1,672,590. GAS FLOOR FURNACE. FRED J. WARD, Long Beach, Calif. Filed Apr. 28, 1926. Serial No. 103,126. 11 Claims. (Cl. 126—116.)



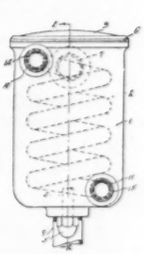
1. A gas floor furnace comprising in combination an outer casing having side walls suspended from the floor, a casing bottom having a central opening with a burner box attached thereto, the burner box being open at the top and bottom, a main radiator supported on the burner box, a radiator top or dome connected thereto, supplementary radiators spaced from the main radiator by transition plates and being suspended from the dome, there being passages for products of combustion between the main and supplementary radiators at the top thereof and vent pipes connected to the supplementary radiators.

1,671,578. ALARM OR SIGNAL DEVICE OPERATED BY THE FLOW OF GAS TO BURNERS. ADOLPH GOODSTONE, New York, N. Y. Filed Jan. 22, 1927. Serial No. 162,887. 1 Claim. (Cl. 116—70.)



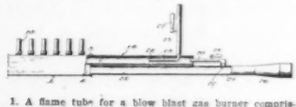
The combination with a gas appliance having an air and gas mixing chamber and a valve for controlling the transmission of gas into said chamber, of a whistle device coupled with said valve and extending into said mixing chamber and into and through which the gas for supply to said appliance is passed.

1,667,795. WATER HEATER. CLARENCE H MORROW, Cleveland, Ohio, assignor to The Hotstream Heater Company, Cleveland, Ohio, a Corporation of Ohio. Filed Feb. 5, 1927. Serial No. 166,143. 4 Claims. (Cl. 257—229.)



1. In a water heater a generally cylindrical casing, a generally helical tubular member concentrically positioned within said casing, connections between the ends of said tubular member and said casing, an axial opening in one end of said casing, a cover upon the other end thereof, and a rod removably positioned in said opening to close the same and in removable connection with said cover to secure the same.

1,661,929. BLOW-BLAST GAS BURNER. HENRY V. DEEMAR, St. Louis, Mo., assignor of one-half to Herbert H. Deemar, Los Angeles, Calif. Filed Jan. 22, 1927. Serial No. 162,889. 2 Claims. (Cl. 158—109.)



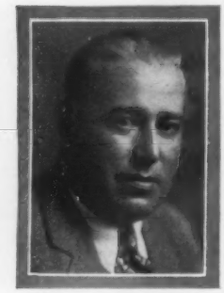
1. A flame tube for a blow blast gas burner comprising an inner, an outer and an intermediate tube arranged concentrically in spaced relation, the outer tube being longer than the intermediate tube, and the intermediate tube longer than the inner tube whereby the fuel is expanded at the end of the tube from which it is discharged and thereby operates to draw fuel up through the tube into which it discharges, the lower ends of the inner tubes having depending flared extensions, means for forcing air into said tubes through said extensions, and means for supplying an air and gas mixture to the intermediate tubes.

With *the* Metermen

New Officers Installed *at* July Meeting

A GOOD summer turnout of Southern California Meter Association members was on hand at McFarland's Cafe, Fullerton, Calif., for the monthly meeting of the meter group on July 26. Fight returns on the Tunney-Heeney mix were broadcast before the banquet.

President T. K. M. Smith, whose time and efforts in organizing and presiding over the Association during the past year have contributed so much to its success, officially turned over the gavel to his successor, B. M. Laulhere of the Southern California Gas Company, at the opening of the business meeting. Mr. Laulhere acknowledged his election in a few well chosen remarks, and then introduced his supporting panel of new officers on which are the following:



B. M. Laulhere

Vice-president—F. E. Huff, Standard Gasoline Company.

Secretary—Arthur G. Lindell, Industrial Fuel Supply Company.

Treasurer—T. G. McAllister, California Gasoline Company.

Chairman Program Committee — E. H. Pann, Pan-American Petroleum Company.

Chairman Entertainment Committee — Kenneth B. Miller, Southern Counties Gas Company.

Chairman Membership Committee—J. J. Delaney, General Petroleum Corporation.

Chairman By-Laws Committee — H. E. Thompson, Los Angeles Gas and Electric Corporation.

Chairman Publications Committee—L. P. W. De Brisay, Los Angeles Gas and Electric Corporation.

The Association's Standards Committee, which has in hand the important work of developing a hand book for the organization, will soon be designated as a permanent committee. Its chairman is Carl W. Brockman of the Union Oil Company.

Following the installation of officers and some items of Association business the meeting was given over to a paper by H. E. Thompson on "The Orifice Meter Formula for Gas." Mr. Thompson, who has done considerable work in simplification of the orifice meter formula, was accorded an interested hearing, and extended discussion followed the paper, which is published in these pages.

Next month's meeting, on August 23, will also be at McFarland's Cafe, Fullerton.

Orifice Meter Formula *for* Gas

By H. E. THOMPSON

*Chemist, Los Angeles Gas and Electric Corporation**

THE material on the orifice meter coefficient formula appearing in this paper was originally prepared by the author to serve as a guide during the use of short-cut methods in such orifice meter calculations as are preliminary to the routine work of daily gas flow measurements. The arrangement in which it now stands was determined by a desire to put the material into its one simplest, most useful and most comprehensible form.

You will note that instead of following the customary procedure of standard treatises on this subject, by following through the various steps of derivation toward the final usable form as a sort of grand climax, it was found preferable to take the accepted forms, dissect them and, with studied precision, explain the purpose and effect of each

* Delivered before the Southern California Meter Association, Fullerton, Calif., July 26th, 1928.

ORIFICE METER FORMULA FOR GAS

For explanation of terms see nomenclature on opposite page.

COMPLETE FORMULA -- Arrangement most indicative of its origin.

Quantity, or No. of cu.ft./Hr	Numerical value of "Q" in Flowing Ft/Sec. uncorrected		Correction Factor	Conversion Factors	
	Orifice area in Sq. Ft.	Ideal velocity due to h,- stated in lineal ft. per sec.	Ideal Vel. to Actual Vel.	Quantity/Sec to Quantity/Hr.	Flow. Cu. Ft. to Std. Cu. Ft.

EQUATION I

$$Q = \frac{\pi}{4}\left(\frac{d}{12}\right)^2 \times \sqrt{2g\left[(h \times 64.375) \times \frac{1}{(P/14.7)} \times \frac{T}{(460+32)} \times \frac{1}{S}\right]} \times C_v \times 3600 \times \frac{1}{P_s/P} \times \frac{T_s}{T}$$

(a) (b) (c) (d) (e) (f) (g)

RE-ARRANGED FORMULA -- Most comprehensible form.

EQUATION II

$$Q = 218.39 \times d^2 \times C_v \times \sqrt{h} \times \sqrt{P} \times \sqrt{\frac{1}{T}} \times \sqrt{\frac{1}{S}} \times \frac{1}{P_s} \times T_s$$

Unity coefficient, or dimensional cu.ft. that would pass if at 1" Diff, 1# Pres, 1° Temp, 1. Sp.Gr	Factors to introduce conditions of flow.	Factors to convert result into cu.ft. as of Std. Pres. and Temp.

Gas flowing, in Cu. Ft. as of flowing Pres., Temp, Sp.Gr.

Quantity of gas flowing, stated in Cu.Ft. as of the standard preferred.

RE-ARRANGED FORMULA -- Conventional form for routine use.

EQUATION III

$$Q = 218.39 \times d^2 \times C_v \times \frac{1}{P_s} \times \sqrt{T_s}^{*} \times \sqrt{\frac{1}{S}} \times \sqrt{\frac{T_s}{T}} \times \sqrt{hP}$$

Assembled constants	Orifice Constants	Std. Unit factors* for Pres.	Std. Unit factors* for Temp*	Corrective factors Sp.Grav.	Corrective factors Flow Temp	Chart data
"Hourly Orif.Coef." for the Orif., pipe and base; Sp.Gr. =1. "Air Coefficient"				Value commonly averaged or assumed.		Numerical value called "Pres. Extension"
"Meter Coef." or "Chart Coef." Values of these terms constant for any one chart. May vary for subsequent charts.						
Numerical values of Air Coef., Corrective factors, & Pres. Extension may conveniently be solved by reference to published tables.						

of the parts thus separated. The following condensed form is the result.

On account of the brevity of this form it seems advisable to warn any who may think it a simple document, that it really covers as much ground, and as fully, as do the bulkier texts. Form of arrangement, rather than sentence structure, is used to set forth the information intended to be conveyed. The rather original arrangement not only makes for convenience, but the writer ventures the assertion that even those who, properly feeling well versed in the subject, yet willing to give this form a little concentrated thought, will not fail to be rewarded in some small measure by a clearer conception of the significance of some of the terms of the formulae.

This form is not intended as an aid to routine chart calculations. The routine man need not understand the mathematics underlying his work, so long as the instructions for its performance are clear to him. However, a broader conception of the work's principles adds interest to its doing, and this form will be found helpful even to those not prepared to grasp its deeper significances.

Nor is this form intended as a substitute for the conventional tables of correction factors and pressure extensions. Tables represent calculations done, that need not be repeatedly done again and are an essential to rapid work of a routine nature. But to be of service, tables must be at hand, which, due to their bulk, is not always convenient; especially if the work is of an impromptu nature.

This form will be found valuable for many types of use. With its guidance it is possible that anyone, though not acquainted with orifice meter calculations, (and even though fortified with but meagre mathematical training), could solve most of the ordinary problems without tables or the help of other texts. At least, it was the intention that this form be a guide of this nature also, which accounts for some of the detail it contains.

EXPLANATION OF FORM

NOTE: Custom decrees that "flowing temperature" shall be introduced as a corrective factor $\sqrt{T_s/T}$ instead of as a logical factor $\sqrt{1/T}$ (see Equation III). To produce this, the logical "Standard unit factor for Temperature," T_s, is separated into two parts, $\sqrt{T_s}$ and $\sqrt{T_s}$, one of which appears in the corrective factor while the other is left, robbed of all individual significance, as an abstract numerical multiplier.

DETAILED EXPLANATION OF EQUATION I.

(a) Q is the number of cubic foot standards per hour, each such unit being that quantity of gas which, under the pressure and temperature of the standard, would fill a dimensional cubic foot. The accepted standard pressure and temperature for gas measurement is 14.73 lbs. per square inch absolute and 520° Absolute, (60°F); although other pressures and temperatures may be locally designated as standard.

(b) $\frac{Pi}{4}\left(\frac{d}{12}\right)^2$ represents the numerical value of orifice area in square feet.

(c) $\sqrt{2g(H\times 64.375)}$ represents the orifice velocity of air at 14.7 lbs. per square inch and 32°F. that would be associated with the differential pressure ($h\times 64.375$). Where 64.375 is a conversion factor for "inches of water at 62°F." to "feet of air at 14.7 lbs. per square inch and 32°F." (The 64.375 was determined experimentally. This was done at 14.7 lbs. and 32° purely for convenience in obtaining accuracy. KENT, P. 174)

(d) $\frac{1}{(P/14.7),}\left(\frac{T}{460+32}\right)\frac{1}{,(S)}$ are conversion factors for changing from feet of air at 14.7 lbs. and 32° to feet of gas at P lbs. per sq. inch, T° absolute and S, Specific Gravity.

NOTE: The total radical, (c and d in Equation I) represents ideal orifice velocity of the flowing gas, as it is of the form $V=\sqrt{2gH}$. Where

$$H=\left[h\times 64.375\times\frac{1}{P/14.7}\times\frac{T}{460+32}\times\frac{1}{S}\right]=$$

the differential pressure stated as of feet of head of a vertical column of fluid that, throughout its height has a pressure, temperature and Specific Gravity identical with that of the fluid at the orifice. It is theoretically and demonstrably correct for ideal conditions but does not include corrections for any of the peculiarities of an orifice when operating within a pipe line. See Paragraph (e).

(e) The C_v factor is a variable. Its numerical value was originally determined by tests, the data from which when appropriately plotted as a function of d/D, gave a curved band of dots. The average or median line of these was assumed to be the true curve freed from accidental and personal errors. This curve, when mathematically solved gave a formula (see nomenclature) from which could be built up accurate tables for the numerical values of the factor for any value of d/D.

The effect of the C_v factor is to introduce at one step a number of corrections, the need for which results from the following: (1) The T and P of the formula are not those measured at the orifice (which they represent), but those measured at convenient points (see nomenclature). (2) The d of the formula is not the diameter of the gas stream (which it represents), but that of the orifice. (see nomenclature); (3) The $\sqrt{2gH}$ is not the actual velocity of the gas passing the orifice, (which it represents), but the velocity that would obtain under ideal conditions.

(g) $\frac{1}{(P_s/P),}\left(\frac{T_s}{T}\right)$ are conversion factors that change the numerical value of the preceding part of the equation from the number of dimensional cubic feet of gas actually passing the orifice at existing pressure and temperature to the number of cubic feet as of a standard pressure and temperature, that represents the same quantity of gas. (see nomenclature.) Measurement "as of a standard pressure and temperature," is necessary because the dimensional cubic feet of gas is, unfortunately, without significance as to useful quantity except as interpreted in connection with a pressure and a temperature. Common sense suggests the conversion to a significant unit referred to a preferred pressure and temperature rather than stating the cubic feet as of the flowing pressure and temperature, as these latter are subject to change.

NOMENCLATURE

Q = Quantity per hour, measured in cubic foot standards. See Paragraph (a).

P_s = Absolute Pressure of standard of measurement, in lbs. per square inch.

T_s = Absolute Temperature of standard of measurement, in Fahrenheit degrees, Absolute.

P* = Absolute Pressure of the gas as flowing, in lbs. per square inch.

T* = Absolute Temperature of the gas as flowing, in Fahrenheit degrees, Absolute.

*Measured up-stream from orifice for "Line connections," and down-stream from orifice for "Flange connections."

S = Specific gravity of the gas as flowing.

C_v = "Coefficient of Velocity." See Paragraph (e). Its numerical value taken as $[.58925+.2725X-.825X^2+1.75X^3]$ for "Line connections" and as $[.606+1.25(X-.41)^2]$ for "Flange connections." Where $X=d/D$

d = Diameter of the orifice in inches.

D = Actual, measured, inside diameter of pipe in inches.

h = Differential pressure, measured in inches of water.

g = Acceleration due to gravity. Numerical value taken as 32.16.

OFFICERS AND CHAIRMEN HOLD NEW ADMINISTRATION DINNER

Out-going officers and standing committee chairmen of the Southern California Meter Association met with the newly-elected group at McFarland's Cafe, Fullerton, on the evening of Thursday, July 12, for an informal get-together. Some business relative to the Association Proceedings and other Association projects was also transacted.

Cities Service Extension *to* Ottawa Progressing

INITIAL construction work on the 132-mile Wichita-to-Ottawa extension of Cities Service Gas Company's 20-inch pipeline, the completion of which will bring natural gas direct from the Texas Panhandle to Kansas and Missouri markets, was actually begun on June 27, when the river crossing crew started to span the Marias de Cygnes river, two and one-half miles southeast of Ottawa. The program calls for six river crossings and all streams will be crossed by several lines as insurance against possible service interruptions. The White Water will be crossed by four 12-inch lines, the West Walnut by three 12-inch, the East Walnut by four 12-inch, the Neosho by four 12inch, the Long Creek by three 12-inch and the Marias de Cygnes by four 12-inch lines. These lines will cross the main channels of the streams, and in addition, two 16-inch lines will cross the overflow areas of all rivers with the exception of the West Walnut and Long Creek.

The entire extension will be a combination welded project similar to the construction between Pampa, Texas, and Wichita, completed last year.

A.G.A.'S ADVERTISING SERVICE IMPROVED IN FORM

With its August issue the American Gas Association's monthly advertising service appeared in slightly different and more usable form. As at present conducted the matrices of advertising copy are accompanied by a proof sheet of illustrations used in the current series, enabling the advertising department to check these proofs against the matrices received. The monthly advertising service of the A.G.A. is an activity of the publicity and advertising section, of which Charles W. Person is secretary.

UTILITY ADVERTISING ASSOCIATION IN CONVENTION, JULY 9, 10

On July 9 and 10 the Public Utilities Advertising Association held its annual convention at Detroit, Michigan, during the annual convention and exhibition of the International Advertising Association. The P. U. A. A. is a departmental of the larger body.

First prize in the gas division was won by the Equitable Gas Company ,of Pittsburgh, Pa.; second prize by the Union Gas and Electric Company of Cincinnati, and third prize by the Lone Star Gas Company of Dallas.

Water Heater Campaigns Hold Sales Interest

(Continued from Page 36)

of heater, in its publicity supporting direct sales.

The number of customers installing automatic gas water heaters on the P. G. and E. system each month averages 1083, and the current campaign is accelerating this normal gain in the water heater load.

SOUTHERN COUNTIES CAMPAIGN

Southern Counties Gas Company's campaign on automatic storage water heaters is a unit of a year-'round sales effort on water heaters begun last January, with a 2000 quota for the year.

Twenty-two salesmen are lined up in this special summer selling contest, conducted along lines similar to the Southern Counties' successful "On to Santa Cruz" campaign last year, which sent the winning salesman to the P. C. G. A. convention. The convention trip will again reward the star salesman, and second prize will be a $25.00 engraved wrist watch.

Sales interest is stimulated by use of a point system, which is reported weekly in a "pep" bulletin—the "Coronado Convention Communique."

One highlight of the Southern Counties drive is the emphasis placed upon sale of heaters in the larger sizes. With sales progress in the contest registered in points rather than in merchandise value or number of units sold, a greater return has been allowed on large size models, graduating down to the 15-gallon size, as follows:

45-gallon heater.....22 points
30-gallon heater.....13 points
20-gallon heater..... 7 points
15-gallon heater..... 4 points

Water heaters connected in combined installation to storage tanks in hotels and apartment houses net the salesmen double point values.

Each week, in order to keep the contestants keenly interested, point bonus prizes are awarded as follows: High salesman for the week receives 10 additional points; second high man 7 additional points; third man for the week, 4 additional points; and fourth man from the top, 2 additional points. In addition to the weekly bonus points, high salesman for each of the three months of the Coronado Convention Race, receives extra points as follows:

High man for the month, 15 extra points; second man, 10 points; third man, 6 additional points, and fourth man for the month, 3 points.

Additional stimulus has been introduced into the campaign by pitting the various company divisions against one another. At the end of June, one division had passed its half-way quota and two other divisions were close behind, indicating that the company's quota would probably be reached by the end of the year.

Last year, by means of an active campaign on water heaters, the Southern Counties jumped its sales from 176 the year previous to 1100. This utility's experience in increasing general merchandise sales by 223 per cent in two years forms one of the best possible examples of what can be done by consistent effort along sound selling lines.

NEW PUBLIC UTILITY HOME FOR OKLA. PUBLIC SERVICE

A new public utility headquarters office building, is being constructed at Sixth and Main streets in Tulsa, Okla., by the Public Service Company of Oklahoma. Work started June 25. It will be five stories in height and 80 by 140 feet in dimensions. Its exterior will be finished in buff stone, and will by illuminated at night. Among interesting features will be a modern display room on the ground floor for appliances. This floor will also house a complete model home of five rooms fully equipped with every modern household appliance. The Public Service Company of Oklahoma is one of the largest gas and electric utilities in Oklahoma, and serves many cities in Eastern Oklahoma.

GAS UTILITY MAN ELECTED TO CITY COUNCIL AT WHITTIER

Walter G. Rich, district manager of the Southern Counties Gas Company at Whittier, California, holds the unique distinction of having been elected a city councilman in his community, his friends claiming him as the only gas utility man on the Coast serving in such capacity. The office was tendered Mr. Rich, with no campaign conducted on his part, and the result is that Whittier will have at least one man who knows the utilities' problems among its city fathers.

LINE TO DURANGO, COLORADO, REPORTED HOPE ENG. PROJECT

According to a news report the Hope Engineering Company will construct a gas pipe line to Durango, Colorado, from the Ute gas area 20 miles west of Aztec, New Mexico, and 35 miles southwest of Durango.

SOUTHERN COUNTIES MANAGERS ACTIVE IN ROTARY

Southern Counties Gas Company district managers are well represented in Rotarian executive circles. George W. Smith, district manager for the Southern Counties at Santa Barbara, returned recently from St. Paul where, as president of the Santa Barbara chapter, he attended the annual Rotary Conference.

C. E. Rutledge, district manager for the company at Santa Ana, late in June was elected president of the Santa Ana Rotarians.

VANCOUVER COOKING SCHOOL HELD IN JULY

The Cafeteria of the Hudson Bay Company store in Vancouver, B. C., was the scene of a gas cooking school during the opening week in July, the school being conducted by Mrs. Florence Gray, domestic science expert, attached to the staff of the manufacturers of the Robert-Shaw Oven-Heat Regulator. During the cooking school a Robert-Shaw Automatic Cook was presented free of charge to every purchaser of a gas range.

B. C. GAS WORKS PICNICS AT BOWEN ISLAND

The annual gas works picnic of the B. C. Electric Railway Company was held at Bowen Island, July 7. A feature which added pleasure to the day's outing was the attendance of the gas works band which rendered selections aboard the S.S. Lady Alexander and at the picnic grounds.

A program of sports was arranged, and Mrs. J. Keillor, wife of the company's gas engineer, presented the prizes at the conclusion of the sports.

J. E. HARE AND E. G. STARR LEAVE CALIFORNIA GASOLINE CO.

Effective June 30, 1928, J. E. Hare, vice-president and general manager, and E. G. Starr, vice-president and assistant general manager of the California Gasoline Company, have resigned their positions with this Texas Company subsidiary. They have opened offices in the Subway Terminal Building, Los Angeles, and it is understood that they have become interested in oil property holdings near the recent Barnsdall-Rio Grande developments at Goleta, Calif.

Mr. Hare and Mr. Starr, together with R. E. Bering and Jack Sherman, founded the California Gasoline Company some six years ago, the California Gasoline being subsequently sold, in 1926, to California Petroleum Corporation.

PORTLAND UTILITY BRINGING GAS TO TIGARD

The Portland Gas & Coke Company has under construction a main extension into the Tigard district. Tigard is situated about six miles southwest of Portland, in the rich farming section of Tualatin Valley. It has a population of about 750, with over 220 homes, all of a good class. Its business and civic center comprises 30 buildings, three churches and three schools. The district is served by bus lines, the Oregon Electric and Southern Pacific Railroads and gives every indication of steady future growth.

The main system proposed will require five miles of two-inch high pressure main and four miles of one-inch high pressure mains, serving over 160 customers.

1928 MAIN LAYING AND NEW SERVICES EXCEED 1927

Construction of 64.8 miles of new gas mains during the past 11 months has been completed by the British Columbia Electric Railway Company at an approximate cost of $414,000, while work is under way on the laying of six additional miles of mains at a cost of $34,000, making a total expenditure for the year of $448,000 on new gas mains and service connections.

During the company year ending June 30, 1927, sixty-seven miles of new mains were laid, and connections made to 3,370 new homes. This year connections have been made to 4,200 new houses.

ARKANSAS CITY, KAN., GRANTS PERMIT TO DISTRIBUTOR

Arkansas Valley Gas Company of Arkansas City, Kansas, has been granted a 20-year franchise to supply the city was gas. Under the new rates which went into effect around July 1st, gas will be served for a period of two years at $1.25 for the first 2,000 cubic feet, 30 cents per 1,000 cubic feet for all additional gas consumed, with $1 set as a minimum charge. These prices will remain in effect after the two-year period, until such a time that the price of gas in the field advances.

GAS BOILERS AT SEAL BEACH PLANT OF L. A. G. AND E.

Three 25,560 sq. ft. cross drum Babcock-Wilcox boilers have been installed at the Seal Beach electric generating plant of the Los Angeles Gas and Electric Corporation, in connection with the addition of a new generator. The boilers will work at a pressure of 400 lbs.

BATON ROUGE UTILITY TAKES IN NEW TERRITORY

Baton Rouge Electric Company of Baton Rouge, La., is extending its gas mains within the city to include the Northdale subdivision. Line laying was begun the middle of July.

A.G.A. CONVENTION TO HAVE IDEAL SET-UP IN OCTOBER

Looking forward to its 10th anniversary convention at Atlantic City, New Jersey, October 8-12, the American Gas Association is getting its program and exhibit arrangements under way, the program committee already having held one session. With more exhibit space available this year than ever before, excepting the 1926 exhibition which equalled the space capacity available this year, reservations have already been made for 75 per cent of the exhibit space.

The largest previous amount of space ever used for an A.G.A. exhibition was in 1926, when more than 56,000 sq. ft. net were used on the Million Dollar Pier. This year it is evident that even the Million Dollar Pier will be taxed, and it is fully expected that at least 75,000 sq. ft. will be necessary for the entire exhibition.

The growth in the number of exhibitors at A.G.A. conventions is shown in the following figures:

In 1919 there were 10 exhibitors; in 1920, 110; in 1921, 112; in 1922, 135; in 1923, 165; in 1924, 182; in 1925, 208; in 1926, 222; in 1927, 235.

One feature of this year's convention is the fact that the American Society for Steel Treating is meeting at Philadelphia during the same week as the A.G.A. Atlantic City session, and a paper on gas by R. G. Guthrie of the Peoples' Gas Light and Coke Company, Chicago, will be delivered before the steel men on Friday, October 12. This will allow gas men to attend the Friday meeting of the steel group and hear the paper on gas.

Atlantic City's facilities for handling conventions are famous in the annals of A.G.A. Convention history, and the 10th convention of the ational association will be staged under ideal conditions.

INSTRUMENT CORPORATION UNDER NEW OWNERSHIP

Manning, Maxwell & Moore, Inc., has purchased the entire manufacturing and selling business of the American Schaeffer & Budenberg Corporation, Brooklyn, New York. The Consolidated Ashcroft Hancock Company, Inc., an operating company owned by the purchasers, will conduct the purchased business in the future. Indicating and recording industrial instruments, an important line of American Schaeffer & Budenberg Corporation manufacture, will be continued under the new ownership.

PETROLEUM EXPOSITION WILL STRESS SCIENTIFIC ASPECTS

Scientific and technical aspects of the oil and gas industry are receiving all of the emphasis in the Fifth International Petroleum Exposition and Congress being held at Tulsa, Oklahoma, October 20 to 29. Exhibit space for the event is selling out with encouraging rapidity as evidenced by the fact that a preliminary exhibitors' list recently issued by J. Burr Gibbons, general manager of the Exposition, contained the names of 125 applicants for space.

OFFICE OF SOUTHERN OREGON GAS CORP. MOVED

Southern Oregon Gas Corporation has moved its Ashland headquarters from Oak street to the Beaver Block, where additional space is available for display of gas ranges, gas refrigerators, furnaces, and other gas burning equipment. D. J. Hollis is manager at Ashland.

NATURAL GAS FOR TAHOTA

Natural gas was turned into the city mains of Tahoka, Texas, late in June, by the West Texas Gas Company.

Free Gas Proposed *as* Bonus *to* Stimulate Appliance Sales

By F. H. HEWLINGS
Superintendent Gas Department
*British Columbia Electric Railway Company, Ltd., Victoria, B. C.**

IN the writer's opinion the following proposition to facilitate the sale of gas appliances by offering Free Gas as a bonus instead of cash discounts, if put into operation, will enable a gas company to meet every description of price competition from departmental stores and others at a minimum loss. At the same time it will encourage the customer to liberally consume his Free Gas and also will be of particular application in introducing modern gas equipment together with the removal and destruction of obsolete gas appliances in use in apartment and rooming houses, which invite electrical competition with consequent loss of all gas consumption. In the examples described below I have allowed a gas bonus in every case whether a cash sale or an installment one, as I am satisfied that it will lead to better relationship with the customer and general public, who are generally on the lookout for "something for nothing."

All Free Gas given as a bonus in every case is to be valued at the company's scheduled rates.

In the examples given below I have taken the scheduled price at $1.00 per M. cu. ft., and the holder costs plus leakage at 50c per M. cu. ft.

* Submitted at the Northern Regional Conference of the Pacific Coast Gas Association, Vancouver.

Cash sale of $100 range with 20 per cent Free Gas.

Cash down $100 entitles purchaser to 20,000 cu. ft. of gas valued at $20, actual cost of bonus to company—$10.

Installment sale of $100 range with 10 per cent Free Gas.

Terms—$10 cash down with balance in 10 equal installments with bonus 10,000 cu. ft. of gas valued at $10; actual cost of bonus to company—$5.00.

Limit the quantity of Free Gas to 1000 cu. ft. per installment period to prevent possible abuse of purchaser who might possibly consume all his Free Gas in a month and then abandon his contract with the company.

Installment sale of $100 range with 10 per cent Free Gas and an agreed value say $10, for the turn over to the gas company of an obsolete appliance.

Terms—$10 cash down with balance in 10 equal installments with bonus of 10,000 cu. ft. of Free Gas on range and 10,000 cu. ft. of Free Gas for old appliance.

Limit the quantity of Free Gas to 2000 cu. ft. per installment period, to prevent possible abuse of purchaser who might consume all his Free Gas in a month, and then abandon his contract with the company.

Actual cost of Free Gas to the company—$10.

UNIFORM SALES PROGRAM FOR GAS SERVICE CO.

Thirty new business managers and assistants from properties of the Gas Service Company organization met at Kansas City, Mo., for an all day meeting, June 29, presided over by F. M. Rosenkrans, general new business manager for the Gas Service Company.

Steps have been taken to inaugurate a uniform sales program over the company's properties, particularly as regards advertising. Ray C. Ratliff, advertising manager of the Kansas City Gas Company, will now prepare advertising for the whole system, the copy to be released so as to tie in with local papers all over the system.

DIXIE COMPLETING ITS LINE FROM TYLER TO LINDALE

The Dixie Gas & Fuel Company of Houston, Texas, is completing a gas line from Tyler, Texas, to Lindale, which will extend through the properties of the Tyler Brick Company's plant. E. J. Dougherty, an employee of the Dixie Company of many years standing, has been appointed as manager of the company at Lindale. Providing there are no further delays in construction, gas will be turned into the line around August 1st.

HERINGTON SERVICE TO START EARLY IN AUGUST

Gas will be turned into the mains at Herington, Kansas, early in August, following the completion of the gas distributing system by the General Utilities Company. This company also owns the systems at Wilsey, Council Grove, and Marion, and has franchises at Florence, Peabody and Hillsboro. Plans are now under way to extend gas lines to these towns.

CONCRETE WAREHOUSE TO BE BUILT IN TUCSON

A new steel concrete warehouse and storeroom is to be built by the Tucson Gas, Electric Light & Power company, it is announced by Max A. Pooler, general manager of the company. The new building, which is to be erected by the Truscon Steel Company at Youngstown, Ohio, will be located at the corner of North Tenth avenue and West Fifth street, opposite the company's power plant.

The warehouse will be 162 by 60 feet and will have a floor space of 8,100 square feet. It will be used for the storage of all classes of materials, including gas and electric supplies. The piers and floor will be of concrete and the remainder of the structure will be of steel. All partitions will be of steel and there will be bins in which to segregate the various kinds of equipment stored. A Monorail system will be installed for the handling of heavy materials. The building will be equipped with offices for the purchasing agent and storekeeper of the company.

STRAIGHT NATURAL GAS NOW AT SANTA BARBARA

On July 9 the Southern Counties Gas Company began service of straight natural gas in Santa Barbara, Calif., and suburbs. Mixed artificial and natural gas of 700 B.t.u. heat content has been served heretofore. A two part rate with a $1 service charge and a commodity charge of 85 cents per 1,000 cu. ft., has been applied, with optional rates for large domestic or commercial users, based on a demand charge of $48 a year for 100 ft. maximum hourly demand, plus 40 cents commodity charge per 1,000 cu. ft.

Safe Operating Pressure *of* Welded *and* Riveted Pressure Equipment

By R. E. Biggs
*Columbian Gasoline Corporation**

CONSIDERABLE time and attention have been given to the study of steam boilers by manufacturers and engineers. There has been a great lack of uniformity in the rules by various authorities and by legislation, but lately, there has been a great effort toward standardizing construction, due to the activity of the American Society for Testing Materials, and chiefly to the work of the American Society of Mechanical Engineers, The A.S.M.E. has issued a code containing rules of construction which is now the accepted standard.

CALCULATING SAFE PRESSURE

To determine the safe pressure to carry on a tank or boiler it is necessary to consider: diameter of shell, thickness of shell, and efficiency of the joint. In making the calculation, a section of the shell one inch long is taken and its diameter is expressed in inches because the pressure as indicated by the gauge means the pressure acting on each square inch. The thickness of the shell is expressed as a fraction of a square inch. The efficiency of the joint is usually about 80 per cent of the strength of the metal from which the shell is made. We must maintain a factor of safety of at least 5. By safety factor of 5 we mean that the bursting pressure is five times the working pressure. The tensile strength of boiler plate is 55,000 to 60,000 pounds per square inch of the metal.

In the example of a tank 30 inches in diameter, the shell of which is one-quarter of an inch thick, on which tank it is desired to carry 100 pounds gauge pressure, the factor of safety would be arrived at as follows: 30x100 equals 3,000 pounds on a one-inch section of the tank, half of this pressure being carried on each side of the tank, (1500 pounds on each side). Considering the tensile strength of the metal to be 55,000 pounds, then 55,000x¼x80 per cent equals 11,000 pounds or the bursting pressure; therefore, the factor of safety is a little above seven.

To find the total pressure to be carried by the shell, multiply the gauge pressure in pounds per square inch by the radius of the shell expressed in inches. To find the stress coming on the shell, divide the total pressure (as found above) by the thickness of the solid plate and by the efficiency of the joint.

The determination of the bursting pressure is very important since upon this depends the maximum pressure to be allowed in operation. The bursting pressure depends upon: Tensile strength of the shell; thickness of the shell; radius of the shell and efficiency of the joint.

To determine the bursting pressure: Multiply the thickness of the shell by the efficiency of the joint and by the tensile strength of the metal, divide the product by the radius of the shell and the result will be bursting pressure in pounds per square inch.

The working pressure is the maximum safe pressure to carry on a boiler and should not be confused with the pressure ordinarily carried in running the engine.

An efficiently welded joint will stand as much stress as the plates that are joined by means of the weld.

*Presented before foremen of Columbian Gasoline Corporation.

L. A. COMPANY MEET PROMOTES CONVENTION INTEREST

With headquarters office employees as hosts the Los Angeles Gas and Electric Corporation Service Group on July 27 held a pre-convention meeting, designed to stimulate interest in the September sessions of the Pacific Coast Gas Association at Coronado. H. H. Ranlett was chairman of the evening. Announcements regarding the coming convention were made and representatives of various P.C.G.A. committees reported on committee progress.

The dinner was held in the corporation cafeteria and those present reassembled in the new company auditorium where the feature of the program was a debate between two teams from the distribution department. The team members, all recruited from men engaged in an appliance survey on the corporation system, had as their subject "Resolved, that the storage automatic compared to an instantaneous automatic water heater is more efficient, economical and renders a better service for domestic hot water." George S. Underhill and Reginald Perradell upheld the affirmative, and F. E. Ditsch and A. C. Valentine the negative.

INLAND EMPIRE GAS CO. HAS EXTENSION PROGRAM

Inland Empire Gas Company has plans underway for service to residents of Brawley, Calif., and also of Calexico, applications now being taken in both points for service. The company's oil gas plant, designed with capacity to serve the communities of Imperial Valley, is located in El Centro. Brawley is 14 miles north of El Centro and Calexico is 12½ miles south, and high pressure line extensions will be made first to the community meeting its application quota earliest. In the case of Brawley 500 applications have been set as quota. Extension to Brawley would serve Imperial en route, and the Calexico enroute, and the Calexico extension would serve the town of Heber. Gas service in all of these points has been pioneered during the past months by the Inland Empire Gas Company, through the use of Rock gas, with El Centro being served direct from the company's gas plant.

GAS REFRIGERATION PIONEER ON U. S. VISIT

Baltzar von Platen, Swedish engineer, who with Carl Munters invented the Electrolux refrigerating system that freezes by means of gas flame, arrived in the United States recently for a two months' visit, during which he intends observing American methods.

ADVENT OF NATURAL GAS IS SUBJECT TO SPECIAL ISSUE

In its issue of Sunday, June 24, the Pueblo Star-Journal devoted an entire section to the advent of natural gas in that Colorado community.

GAS PLANT SOLD FOR 7,500 TO MORAN CORPORATION

The Magnolia Park gas manufacturing plant of Houston, Texas, valued in former years at $78,000, was sold recently by the city council for $7,500 cash to the Moran Corporation of South Shreveport, La. The city advertised the plant for sale over a period of several months, but very few bids were received.

OKLA. UTILITIES ASSN. SETS 1929 MEETING DATES

Oklahoma City was chosen as the place and March 12, 13, 14 as the dates for the 1929 state convention of the Oklahoma Utilities Association, by the executive board of the Association at its quarterly meeting held July 18 at Oklahoma City. This will be the eleventh annual convention of this organization. Attendance is expected to be about 1,000, the registration including representatives of the gas, electric, telephone, and electric railway companies of the state, and of manufacturing companies supplying machinery and appliances related to the utility industry. L. W. Scherer of Yale is the president of the Association.

TECHNICAL SCHOOL EQUIPS FOR GAS USE

The gas department of the British Columbia Electric Railway Company has been awarded a contract for the supply of heat-controlled gas ranges and gas-fired steam cookers for the cafeteria in the new technical school under erection at Broadway East, Vancouver. Gas soldering furnaces and other industrial equipment for the laboratory are also included in the contract.

MUNICIPAL ADMINISTRATION TO BE INSTITUTE STUDY

Announced for August 13-18 an institute of municipal administration is to be conducted by the University of Southern California, Los Angeles. Mayors, managers, commissioners, city and county officers, representatives of industries, and citizens interested in public affairs are invited to attend the sessions, which will cover a scientific and practical study of modern municipal administration. City planning, municipal finance, public health, municipal engineering, legal problems of muicipalities, public institutions, street traffic control and legal problems of municipalities are among the subjects to be considered.

PENNSYLVANIA MEN STAGE FIRST CONVENTION

Meeting in its first annual convention, the Pennsylvania Natural Gas Men's Association convened for a two-day session on June 20 at Butler, Pennsylvania. Officers elected for the coming year were, for president, George W. Ratcliffe, Columbia Gas & Electric Corporation; for vice-president, George E. Whitwell, Equitable Gas Company; for secretary and treasurer, E. J. Stephany.

CENTRALWEST HAS FRANCHISE IN OKEENE, OKLA.

Okeene, Oklahoma, has granted a natural gas franchise to the Centralwest Gas Company.

1928-29 Calendar

Pacific Coast Gas Association, 35th Annual Convention—Hotel Coronado, Coronado, California, September 17 to 20.

American Gas Association—Atlantic City, N. J., October 8, 9, 10, 11 and 12.

Oklahoma Utilities Association, 11th Annual Convention—Oklahoma City, Okla., March 12, 13, 14, 1929.

Second National Fuels Meeting—Cleveland, Ohio, September 17 to 20.

THREE COMPANIES COOPERATE IN GAS BUREAU

Combining their efforts through the organization of what has been called the Gas Bureau, the Southern Counties Gas Company, Southern California Gas Company, and Los Angeles Gas and Electric Corporation are doing some effective work in promoting popularity of gas in southern California. Three booths have been taken cooperatively in the Pacific Southwest Exposition, now drawing international attention at Long Beach, California, two of the booths being given over to a modern gas kitchen with ranges in color and one booth being fitted up as a gas refrigeration display featuring refrigerators in color. One attractive feature of the all-gas kitchen is the colored tiling supplied by the American Caustic Tile Company.

Another activity representing the cooperation of the three southern California gas companies is Liemert Park, an all-gas real estate development in southwestern Los Angeles which will open August 18. Several hundred thousand people are expected to view the 12 bungalows and the two four-flat buildings, all of which are designated as Blue Star Model Gas Homes. Gas refrigerators and ranges in the kitchens of these units are in color.

The Gas Bureau's efforts are all directed to coordinating activities relating to gas sales promotion in southern California. Representing the three companies on the Bureau are Clyde H. Potter, general commercial agent of the Southern Counties Gas Company; Charles M. Grow, new business manager of the Southern California Gas Company, and Frank Weiss, manager of new business for the Los Angeles Gas and Electric Corporation.

MOODY-SEAGRAVES INTERESTS PURCHASE PHILLIPS' HOLDINGS

The Moody-Seagraves interests of Houston, Texas, have announced the purchase of control in the E. L. Phillips utility companies located in the southwest. This purchase brings under one organization the Houston Gas & Fuel Company, Houston Gulf Gas Company, Southern Gas Company, Southern Gas Utilities Company, Western Gas & Fuel Company, the Dixie Gulf Gas Company, and the Dixie Gas & Fuel Company, serving the towns of Houston, San Antonio, Austin, Beaumont and Laredo. The Dixie Companies were already under Moody-Seagraves ownership.

Mr. Seagraves is president of the United Gas Company,the holding company for the various properties affected. These properties include in addition to natural gas reserves, some 2,000 miles of trunk pipe line.

These interests are contemplating construction of a gas line from their northeast Louisiana holdings to St. Louis, Mo., and also a line 150 miles in length from southwest Texas to Monterey, New Mexico.

LARAMIE HOMES SOON TO GET MANUFACTURED GAS

Gas service will be available to most of the city of Laramie, Wyo., by the end of August, according to R. Y. Lisco, Jr., manager of the Laramie Gas Company. Mains have been laid in the down-town district, and are being extended through residence sections. A modern water gas plant is now under construction for Laramie's service.

TRACY TAKES FAIRMONT POST

Frederick B. Tracy of Muncie, Ind., has been appointed to the post of general manager of the Jackson County Light, Heat and Power Company of Fairmont, Mo. The position was vacated by the recent death of D. S. Milne.

Evolution *of the* Water Gas Machine

(Continued from Page 22)

supplying the air at the required pressure; gas and steam connections. This very simple outfit was capable of producing water gas or blue gas, but with a very low thermal efficiency as the latent heat of the blast gases and all of the sensible heat of both the blast and make gases was completely lost.

The gas made with this equipment was not suitable for distribution by utilities because of its low calorific value. In the early days of the gas business, franchise requirements were based on candle power first, as the gas was largely used for illumination. The water gas machine of the first period, therefore, had no place in the gas equipment of the utilities of that day.

CALORIFIC VALUES INCREASED

The equipment of the second period, numbered Two, made the water gas process useful to the utilities by increasing the candle power and calorific power of the gas to the required standard. This was accomplished by adding the so-called carburetor and superheater, or a combination of the two, in which oil was cracked to oil gas during the gas-making cycle. The heat for the cracking was supplied by the sensible heat of both blast and make gases, as well as burning a portion of the blast gas with secondary air at the top of the carburetor. This was one of the many uses which was found for crude oil during the early development of the oil industry in this country. Both oil and fuel were cheap and the installation itself was very simple. The gas made was found to be in every way suitable for either supplementing or mixing with coal gas. The fact that the process was crude and inefficient was not so important during this period of the development of the gas industry.

The developments of the third period, numbered Three, were directed to the improvements in the overall thermal efficiency of the process and in obtaining an increased capacity per unit of grate area. This period opened with the invention and development of the so-called up and down run method of operation with its hot valves, which has already been briefly described.

No provision had been made in the early stages of development for the recovery of the sensible heat of the blast and waste gases. One of the important developments of this period was the waste heat boiler with which high pressure steam could be generated in sufficient quantities to practically make the water gas machine independent of any outside steam supply. This steam was made by utilizing heat which was completely wasted in machines not equipped with waste heat boilers.

During the third period, many mechanical improvements were also brought out such as the substitution of hydraulic operation for hand operation, and concentrating the controls at one point to conserve time in their manipulation.

Although these improvements did not in any way affect the basic principles of the operation, they did serve to increase the overall thermal efficiency of the water gas machine to a point where the water gas process became a very important factor in the gas industry. Many cities were supplied with water gas exclusively. This was particularly true of some of the larger cities where, due to congestion, the high cost of real estate, and a questionable coke market, water gas could be made more advantageously than coal gas.

THE BACKRUN PROCESS

The equipment of the fourth period is shown on the diagram as Number Four. It is evident that much more progress has been made in the seven years of this period than was made during any previous period. At the opening of this period, it was generally conceded that coal gas could be made much more cheaply than water gas with the prevailing markets for coke at that time. Also there was a considerable uncertainty as to the price and availability of oil for the future. The outstanding development of this period was the so-called Backrun Process.

Backrun Gas is the gas made by a process involving the use of superheated steam passed in the reverse direction through a water gas machine, the so-called Backrun being substituted for the ordinary down run. The Backrun steam is admitted at the top of the superheater, passes down through the superheater, up through the carburetor and into the top of the generator. The steam, because of this treatment, becomes superheated to the temperature existing at the top of the carburetor. This highly superheated steam now passes down through the generator. The resulting gas is taken directly from the base of the generator through the Backrun pipe to the wash box.

Backrun gas is also made by leaving the Backrun steam connection in the top of the generator and passing the steam down through the generator and out through the base of the generator directly to the wash box. When this part of the Backrun process only is practiced, the benefits resulting from the highly superheated steam are not realized nor the further benefits of the scurfing of the checker brick by the reverse action of the steam through the superheater and carburetor. This method of operation does, however, result in an increased efficiency of the machine because of the gases during the Backrun leaving the base of the generator at temperatures considerably below the temperatures in the carburetor and the superheater.

THERMAL EFFICIENCIES INCREASED

The outstanding advantage which results from Backrun gas is an increase in the thermal efficiency of the water gas machine. This follows from the fact that the temperatures at the top of the superheater are lowered, as the upper part of the superheater acts as a regenerator. The blast gases leave the machine at a lower temperature, and the gases made during the up run also leave the machine at a lower temperature.

The Backrun gas, which is formed by admitting the steam to the top of the superheater, picks up the heat in the upper courses of checker brick in the superheater and carries it back into the generator. This Backrun gas leaves the bottom of the generator at from 200° to 500° F., depending on the amount of clinker in the base of the generator and somewhat on the operating cycle.

Also, the Backrun steam, in passing down through the superheater and up through the carburetor, is superheated to the temperature of the top of the carburetor before entering the generator, therefore all of the Backrun gas is made with highly super-

heated steam. This is one of the outstanding advantages of the Backrun process, especially so when soft coal is used as generator fuel.

The net result of the lowering of the temperature of all of the gases leaving the machine is to give a higher thermal efficiency than is theoretically possible with a water gas machine not equipped to make Backrun gas.

This high thermal efficiency is immediately reflected in a saving of both generator fuel and oil. The generator fuel is decreased by the amount of the sensible heat regained. Oil is saved because of better temperature conditions throughout the machine and because the checker brick can be kept clean over a longer period.

In the earlier days of water gas development, anthracite coal was used as generator fuel. Later, this was largely replaced by coke. The cost of either anthracite coal or coke is more than the cost of bituminous coal. It is obvious then that a material reduction in the cost of gas could be obtained if soft coal could be substituted for the hard fuel. With the many improvements that have been made in the water gas process, soft coal can now be used with entire success. Many factors have contributed to this very important development and the many plants which are now running exclusively on soft coal, which previously ran on coke, are the best evidence of the success of this development.

Another important item of expense in the cost of making water gas is the process steam. It has now been completely proven that exhaust steam can be substituted for live steam for water gas making. The air blower is the largest single user of power in the water gas unit, but when the blower is being run there is no demand for process steam. The development of the steam accumulator has solved this problem by making the exhaust steam not only from the blower but from the other auxiliaries of the plant available whenever required. This practically eliminates the cost of process steam as compared with the previous method of operation.

ELIMINATING LABOR

One of the most interesting and ingenious developments has been the automatic controls or "runners" that have been brought out for eliminating the hand manipulation of the valves. It is now possible to operate a water gas machine with absolutely no hand manipulation. These controls have been perfected to a point where they will care for almost any emergency, and by the elimination of labor tend further to decrease the cost of the gas made.

The problems of charging the fuel into a water gas machine presented serious difficulties because of the temperatures and pressures in the top of the generator. These problems were purely mechanical and the charging machines now on the market are working with complete satisfaction and not only spread the fuel as it enters the generator but accurately weigh the fuel charged. The charging machine still further eliminates hand labor and increases the capacity of the machine not only because of the more uniform fuel bed conditions but because the machine is not shut down for fueling as was the previous practice.

For many years extensive experiments have been carried on in the development of a device for automatically and continuously removing the ash and clinker formed in the water gas machine. From a mechanical standpoint, this is much the most difficult problem of this whole development. This problem, although the most difficult and the last to be solved, seems to be passing out of the experimental and into the commercial stage. With the perfection of mechanical clinkering, the water gas process becomes fully automatic and continuous, as the fuel is charged without stopping the machine and the ash and clinker are removed mechanically and automatically. This is a further and very important step in reducing the cost of water gas as the elimination of the labor of clinkering is a very important item.

The elimination of side wall clinkers, which is realy a part of continuous clinkering, has been attacked in many ways and we now have available means for preventing the formation of side wall clinker, thereby saving to the process the expense and exhausting labor which was necessary in its removal.

The problem of the more efficient use of oil for carburization has received much attention. This problem is seriously complicated by the lack of uniformity in the oils available, but the records show that the oil efficiencies now being maintained on modern plants are much higher than were previously obtained due to the better knowledge of checkering the carburetor and superheater and more efficiently designed oil sprays.

LOW GRAVITY BACKRUN

Although the water gas machine can be quickly started and shut down on a moment's notice and has a wide range of flexibility, this flexibility has been very greatly increased by the development of the so-called Low Gravity Backrun Water Gas Process. This process consists simply in spraying the oil into the top of the superheater during the Backrun part of the cycle. This oil is cracked during its course back through the machine. The carbon in the oil remains as fuel in the generator. The hydrogen formed by this cracking process increases the volume of gas made during the Backrun in proportion to the amount of oil added. The capacity of the machine can therefore be increased to the extent of the oil added during the Backrun cycle. As the specific gravity of water gas is controlled by the hydrogen content, this increased capacity is due to the addition of hydrogen by the cracking of the oil in the generator. The gas so made is much higher in hydrogen content and therefore of a lower specific gravity. This lower specific gravity is an additional advantage during peak loads as it tends to relieve the distribution system during the time of greatest demand.

The Low Gravity Backrun Water Gas Process is a new development and there is not enough accumulated experience to state definitely that the process is going to be useful for anything more than peak load demands. This in itself is extremely important. If it is found that it can be run continuously and still maintain reasonable economy, it will solve the problem of varying gravities when coal gas and water gas are mixed in varying quantities. This development tends to keep the initial investment in plant at the minimum, which is another important step in the reduction of the cost of water gas.

There is a growing tendency everywhere to prevent the contamination of streams by pollution from industrial plants. Gas companies have been given credit for this offense quite out of proportion to the facts. Although the problem of the elimination of phenols and tar acids in the coal gas process has not been entirely solved, the problem of the disposal of effluent from the water gas machine has been completely solved by using this effluent directly in the top of the superheater during the Backrun cycle in place of process steam. This effluent, consisting mostly of water, is flashed into steam in the top of the superheater and passes back through the machine as process steam. On installations where waste heat boilers are used, the effectiveness of the waste heat boiler will be reduced correspondingly. On installations not equipped with a waste heat boiler, the use of effluent or water in the top of the superheater eliminates one-half the process steam. This is not an important economy where exhaust steam is being used, but it is a very important economy where live steam is used or where the plant is so located that the disposal of the effluent from the plant is difficult.

Natural Gas Project *for* Utah Communities

PLANS for a natural gas line to extend from the Baxter Basin gas fields in southwestern Wyoming to Salt Lake, Ogden, and other Utah communities—a project which several companies have had under consideration at one time or another for a number of years—are again receiving general attention in the Utah and Wyoming press. Interests involved in the present project are the Ohio Oil Company, Lone Star Gas Company and Columbia Gas and Electric Company.

Franchises have already been asked for in Salt Lake City and Ogden, as well as in the surrounding communities.

The line contemplated would be approximately 350 miles in length and would be constructed at a cost ranging between $18,000,000 and $20,000,000. It is estimated that it would be necessary to lay 350 or 400 miles of distribution mains in Salt Lake in order to serve consumers, and approximately 250 miles of pipe in Ogden. Considerable opposition to the natural gas enterprise has developed at the hands of coal mining interests.

The definite route the line would take has not yet been determined, though preliminary surveys are being run by two surveying crews in the field, the route most talked of extending in a northeasterly direction from Salt Lake City to the gas fields. A branch to Ogden would leave the main line at Coalville. Plans for the line specify 18- and 20-inch pipe.

L. B. Denning, president of the Lone Star Gas Company of Dallas, Texas, and vice-president of the Columbia Gas and Electric Company of New York, and John McFadyen, vice-president of the Ohio Oil Company, are acting for the interests concerned in the natural gas action.

RAYMOND GETS ADVERTISING POST IN SAN DIEGO

Co-incident with completing his third year as editor of the "News-Meter," employee organ of the San Diego Consolinated Gas & Electric Company, Forrest M. Raymond in July was advanced to the position of superintendent of advertising with his company. Rapid expansion in the San Diego utility's commercial department makes Mr. Raymond's new post a responsible one.

SUPERBO DEDICATES PLANT WITH BARBECUE

The Superbo Water Heater Manufacturing Company of Los Angeles officially dedicated its new water heater factory, on Saturday, July 21st, with an old fashioned barbecue. The new plant is located at 5555 Magnolia Avenue, and is now headquarters for all sales, servicing and production.

Cities Service Bettering Many Compressor Stations

WORK has been completed on the installation of the 1,000 H. P. Cooper compressor units at the Ottawa and Wichita compressor stations of the Cities Service Gas company and the engines placed in preliminary operation July 10.

Construction at Ottawa started April 23 and at Wichita April 30, the main buildings at each station being extended 28 feet to accommodate the units. These installations increased the capacity of the Ottawa station to 5,000 horsepower and that of the Wichita station to 3,000 horsepower.

These units are similar in make and design to the equipment installed last year when these stations were constructed, and will be necesary to handle the additional volume of gas that will be available when the 132-mile Wichita-to-Otawa extension of the Cities Service Gas Company's 20-inch Panhandle natural gas pipeline is completed this fall.

The Cities Service Gas company, an Empire subsidiary, has four main line compressor stations on this project—at Pampa, Mooreland Wichita and Ottawa — with a total capacity of 15,000 horsepower, boosting Panhandle gas to northern markets.

CHANGES AT PETROLIA

Several major changes are now in progress at the Petrolia compresor station of the company, near Chanute, Kansas. Unit No. 5, which was installed in 1905, has been completely reclaimed and about 350 cubic yards of the old concrete foundation blasted out. A new foundation will be laid to accommodate a 1,000 H. P. Cooper unit which will be installed shortly and will make the third unit of similar make and capacity installed at the Petrolia station within the past four years. With this completion Petrolia will have a total capacity of 7,300 horsepower. Work is also well under way on the installation of new auxiliary equipment at this station, which will include new generating units, new switchboard, new air compressors and new circulating pumps. It will also be necessary to construct a new water pump station at the Neosho river, about 1,000 feet from the station proper. The station will be kept in operation while these changes are being made.

New auxiliary equipment has also been going in at the Tallant, Oklahoma, compressor station of the Cities Service. This work, started early in April and now nearly complete, includes the installation of two 190 H. P. Cooper twin gas engines, driving two 120 K. W. 440 volt three-phase 60-cycle generating units, the replacing of all pumps and the air compressors used for starting the engines with new equipment, and the construction of a new circulating water pump house. In addition, all service lines to company houses were rearranged and four new 12-car garages and a new system of roads, sidewalks and fences constructed. The Tallant station, one of 24 compressor stations owned and operated by the Cities Service Gas Company, was kept in continuous operation during the time this work was being carried on.

GASOLINE PLANT WILL HAVE CAPACITY OF 30,000 GALLONS

Gilmore-Dabney No. 2, as the Gilmore-Dabney Gasoline Corporation's new gasoline plant at Linden and Columbia Streets, Long Beach, is to be known, will have a capacity of 30,000 gallons per day. J. A. Campbell has the contract for the plant.

LEFT: Manhole frame on 12,000-gallon benzol still kettle, showing patch over crack in casting. RIGHT: Close-up view of patch. Alemite gun applied at pipe plug in center of patch.

Solving *the* Problem *of* Emergency Repair *on* Benzol Tank

By N. H. WARDALE
Portland Gas and Coke Company

THE Portland Gas and Coke Company were recently confronted with a serious failure in a large manhole frame casting on a benzol still kettle The plant was operating at full capacity to refine benzol for a 300,000 gallon shipment to go by tank steamer on a certain date and a shut-down sufficiently long to permit removal of the casting for repair by welding or for replacement would probably have prevented the benzol being ready in time. Welding in place was out of the question on account of the fire hazard and the driving of hot rivets would also have been dangerous.

As will be seen in the photographs patches of 3/16-inch steel plate were placed over the cracks, three in number, which developed in the casting. The cracks were first grooved with an air chisel and holes drilled and tapped at the ends of each crack into which plugs were screwed to prevent the crack extending further. In the center of each patch a hole tapped for ¼-inch pipe was provided and an Alemite gun was filled with "Smooth-On" cement and the cement forced into the crack so that all spaces between the patch and the casting were filled. After setting 12 hours the Alemite gun was again applied to make sure the patch was tight. The still was then filled with benzol and started without any sign of leakage.

A saving of at least five days operating time and $300 resulted and what was thought would be at best a temporary repair has proved to be a permanent proposition. To anyone familiar with the solvent action of hot benzol and its ability to find the smallest crack through which to leak, the repair appears remarkable.

Many similar problems where saving in time and danger of welding are factors, such as in gas main leaks, could no doubt be solved successfully in similar manner.

TWIN FALLS, IDAHO, PERMIT ASKED BY MELEKOV

Leon Melekov of the Tracy Gas Company of California has requested a franchise to erect a gas plant at Twin Falls, Idaho. The city commissioners have the application under consideration. Mr. Melekov has just completed a plant at Tracy, California, and is building another at Flagstaff, Ariz.

GASOLINE PLANT SUPT. AT WICHITA LOCATION

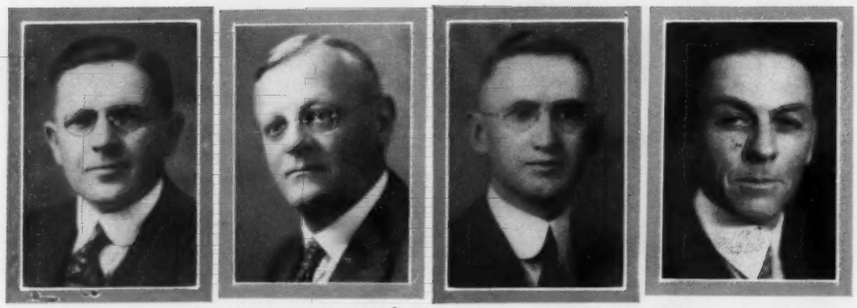
Ed Stauffacher, assistant superintendent of tests and contracts for the gasoline division of the Empire Companies, has been transferred to Wichita, Kansas, where he assumed his new duties as superintendent of the Wichita gasoline plant, effective, June 25. Mr. Stauffacher is a graduate mechanical engineer of the University of Minnesota.

NEW SAFETY SUPERINTENDENT APPOINTED BY COMMISSION

C. H. Fry has been appointed superintendent of safety by the California Industrial Accident Commission. Mr. Fry is a graduate of the College of Mines, University of California, 1907, and has had extensive experience in the mining field with the Industrial Accident Commission and in other connections.

NEW METER HANDBOOK OF IMPORTANCE TO INDUSTRY

In its new memorandum and handbook the Pittsburgh Equiable Meter Company has produced something of considerable interest and value to the industry. Tables giving specifications for metering and regulating are included in its contents. The company will send a copy to anyone requesting it.



F. E. Seaver *T. H. McCrea* *E. N. Simmons* *Frank Weiss*

Executive Changes *on* L. A. G. *and* E. Corp. Staff

THOMAS P. McCREA, secretary and director of Los Angeles Gas and Electric Corporation, has resigned from these positions, effective August 1, concluding a connection of more than 35 years with the utility.

F. E. Seaver, for some time assistant secretary of the corporation, has been named to succeed Mr. McCrea as secretary, and Frank Weiss, manager new business, was elected to the directorship made vacant by Mr. McCrea's withdrawal. E. N. Simmons, auditor, was given the additional duties and title of assistant secretary.

Mr. McCrea, who is retiring to enjoy a well-earned rest, entered the employ of the utility company in May, 1893, as accountant. Advancing later through the positions of auditor, purchasing agent and assistant secretary, he became secretary in May, 1916, and was elected a director in 1920.

Mr. Seaver, who succeeds Mr. McCrea as secretary, has been with the organization since May, 1907. He began as assistant bookkeeper, passing through the positions of bookkeeper, order clerk, chief bookkeeper, superintendent Los Angeles office, and assistant secretary. He has held the latter post since November, 1917, and is also a director of the corporation.

Mr. Weiss, the company's new director, started in May, 1904, as a telephone clerk. He later served as bookkeeper, collection clerk, chief bookkeeper, superintendent Los Angeles office, assistant secretary and, since November, 1917, has been manager new business.

Mr. Simmons, who now becomes auditor and assistant secretary, began in July, 1909, as a messenger, and advanced through various clerical positions to that of auditor, in March, 1925.

Is There *a* Best Method *of* Paying *for* Appliance Sales Results?

(Continued from Page 20)

cent on the full retail selling price; if any trade discounts are given, the rate is 3 per cent. In addition to these commissions, district representatives are paid $1 for each new service taken from an existing main and 50c for each service on a new main extension.

One per cent commission is paid on gas heating and industrial installations to the district salesmen who hand over these prospects to either the industrial or heating departments. The salary paid salesmen is compensation for service work demanded on their territories, such as signing up meters, laying out piping, giving information in the company's interest. Our gas heating sales are run as a separate department and the remuneration for the heating salesmen is $175 per month and 3 per cent commission.

No allowance is made towards automobile expenses and about 50 per cent have cars, but all are supplied with free transportation on the street cars.

Showrooms sales staffs receive commission of one-half of 1 per cent on all sales signed up in the showrooms; the salaries vary according to qualifications and length of service.

We are thoroughly satisfied with our existing schedule, as it works out satisfactorily.

Company C—This question was partly answered in Question Number 2. In addition to our salesmen, we have a sales superintendent or commercial agent in each of our eight districts. These men, depending on their ability and the length of time they have been employed with us, are paid anywhere from $160 to $200 per month, plus a 1 per cent commission on all merchandise sold in their respective districts. This seems to be a particularly powerful weapon, and our commercial agents do not hesitate to demand late afternoon and evening calls from the salesmen and they themselves frequently accompany these salesmen.

The success of a sales organization depends entirely on the sales setup and compensation plan. Furthermore, the company policy must be definitely committed to the sale of merchandise. With electric and oil competition increasing noticeably, our company is making every effort to anticipate it and head off the competitor. We do not hesitate to make long discounts to apartment houses, people using electric equipment and to schools, in order to get approved gas appliances installed.

We believe absolutely in quality merchandise. The reason that people are weaned away by the romantic tales of a rival industry is because they are dissatisfied with the present inefficient, inadequate junk called gas appliances. If a woman has expended at least $100 for a full enameled, oven controlled gas range, you may be assured that she is not going to be intrigued into electric cooking. Satisfactory service on the part of the company should keep her sold, and that is just what we are striving constantly to do.

Company D—Below is given ou scheme of compensating salesmen:

Domestic Appliance Salesmen

Salary: $100, as agreed upon at time of employment.

Commission: 10 per cent of net territory appliance and connect sales plus 5 per cent additional on all sales in excess of $1,000 in any one month.

Extra Bonus for *dead services revived:* For all dead services revived that have been dead one year or more, a commission of $3 will be paid. For all dead services revived that have been dead six months to one year, a commission of $1 will be paid. For all dead services revived that have been dead less than six months, a commission of 50c will be paid.

Salesmen's commission for continuous revenue from dead services revived:

Dead one year or more when revived: For every month that the above service continues to use gas, a special bonus of 50c a month will be paid up to and including the tenth month.

Dead six months to one year when revived: If the service is used continuously for six months, beginning the seventh month, a bonus of 50c on each service under the above class will be paid up to and including the twelfth month.

New services: A commission of 10 per cent of the price charged customers for new gas service run.

Meter applications on new services: For each meter application turned in where a new service is run, a commission of $2.00 will be paid.

Industrial Salesmen

Salary: One at $125 and one at $150.

Commission: 10 per cent of net territory appliance and connection sales, plus 5 per cent additional on all sales in excess of $1,000 per month.

Extra Bonus on new services: A commission of 10 per cent of the price charged customer for new gas services run, will be paid. For each meter application turned in where a new service is run, a commission of $2 will be paid.

House Heating Representatives

Salary: $150, as agreed at time of employment.

Commission: 15 per cent of net house heating and installation sales. To be paid upon the following basis:

7½ per cent of net house heating appliance at the close of the month in which order was secured.

7½ per cent of net house heating appliance and installation sales at the close of the month in which appliance installations are made.

Floor Representative

Salary: $100 per month, as agreed upon at time of employment.

Commission: One-third of 1 per cent of the net appliance and installation sales, less appliances returned.

Company E—We divide the town into five parts, each of which has a sales representative assigned to it. It is our idea that in order to secure the most enthusiastic work from the sales representative, we give him protection in his particular section on the major appliances, such as refrigerators, gas ranges and water heaters, electric ranges and water heaters, water pumps, etc. Each district salesman is allowde the credit on the sale whether it is made in the office or in the field, either by him or by the floor salesman, providing our prospect cards show he has done work toward making the sale. All prospects which come into the office are

handed to the district salesman and it is required that he show work done on this prospect within 24 hours. We find that this system results in satisfied sales representatives who are producing each month, more than the average salesman through the United States. These district salesmen jobs are very much preferred and our turnover on salesmen is practically nil, which gives us at all times a corps of enthusiastic and well trained salesmen.

On all the above sales other employees are allowed prospect commission upon any lead they turn in, and upon which sale is made. A record of the employees turning in leads is kept on prospect cards. Employee's right to prospect money is good only for 90 days after turning in the name, thereby obviating turning in supposed prospects promiscuously. The same employee may renew his prospect right after 90 days with work done toward the same and an additional report.

The above scheme is only for the major appliances and has been arranged for the purpose of obtaining the consistent work of sales representatives. For such leads turned in and from which sales result, employees are paid 3 per cent. I would say that it has been very successful.

All smaller appliances, such as fans, cookers, waffle irons, lamps, etc., can be sold by any employee, there being no protection to the district salesman. Most of these are sold by concentrated campaigns, at which time bonus and commission schedules are arranged and announced by letter to all employees, on the same basis.. This results in enthusiastic work of the whole organization toward the success of every special campaign. Incidentally the employee may pick up a prospect for a major appliance upon which further work has to be done by the district salesman.

In general you can say that our arrangement is prospect money to all employees for major appliances which have to be sold by the district representative and full commission for the sale of minor appliances by any of the employees. As many as 40 or 50 employees in addition to the members of the sales department participate in this form of compensation each month. One or two of our employees, who are receiving a salary of about $175, are making in addition to this salary, $50 or $60 per month from the sale of appliances. These extra commissions to employees are announced at our regular monthly meeting of the employees, at which time they arouse considerable interest and good-naturd competition.

The district sales representatives receive a salary of $60 per month plus 10 per cent commission on sales. They may also turn in prospects on appliances being handled by special crews and receive the regular employee commission.

Company F—All of our merchandise salesmen are paid flat salaries. Employees are paid two per cent prospect commission upon 60 days after business is turned in.

We are attempting to so build our organization that there will be plenty of opportunity for salesmen to advance from one position to another with an increase in salary. We have enough steps of this kind to make the proposition attractive to that type of employee whom we wish to retain with us.

It is my opinion that the plan of having operating employees turn in prospects to be closed by experienced salesmen involves the best possible use that could be made of such untrained people. We do not rely on these employees for a large part of our business and believe it is a mistake to do so. We do want their co-operation and help and are willing to pay them for it. We rely on a good salse organization to get the major portion of our business, both from the standpoint of securing prospects and closing sales.

Company G—We employ salesmen on drawing account and commission basis. We pay our salesmen $57.50 drawing account on each pay for two weeks and sales are made by them on the following commission basis:

Gas Appliances—Cash sales 15 per cent, Time Sales 14 per cent.

Electric Appliances—Cash Sales 10 per cent, Time Sales 9 per cent.

Electric Ranges—Cash Sales 10 per cent, Time Sales 9 per cent.

We have never adopted the policy of giving employees commissions on prospects which you mention as being in vogue with the eastern utility companies. However, we are much interested and will appreciate any information you can give us on the matter.

Company H—In this small company, our employees have practically all been with us for eight or ten years, with the result that it might be called a "family affair." Everyone is interested in the sale of appliances in both office and street crews.

When a prospect is developed by an outside man, the same is reported to the salesman in the office, who immediately follows up the prospect.

The remuneration is taken care of by an extra cash allowance at the end of the year, apportioned to the employee in accordance with his record for the year. There is no fixed percentage and the amount is governed more by general record and spirt of interest and co-operation in the general services of the employee, than any spcial appliance sales that may have been closed through his particular effort.

In other words, the sale of appliances is only a portion of the spirit of co-operation that it has been our aim at all times to build up among the employees of this company.

Company I—Our system is perhaps different from any other on the Pacific Coast and it has proven very satisfactory.

In the first place, our meter readers are in the sales department and are called district representatives. They have a certain territory in which to read meters, collect bills, make adjustments, secure prospects and sell. They average 50 meter readings a day and as this does not take very much time, they have the rest of the day in which to do the other things. If they haven't the time to follow up the leads, they turn them in to the sales department and our regular salesmen are then sent out to secure the orders. The district representatives, however, secure the credit. They are paid a straight monthly salary and in the event of special sales or special drives, they are given a commission on all appliances sold during the drive. Otherwise, commissions are not paid.

A daily record is kept of each representative's activities and sales. At the end of the month they are totaled and the district representative who has the largest amount of sales is given due recognition. Our regular salesmen are paid on a straight salary basis, and are under no circumstances paid a commission. They do, however, keep daily records and of course the leaders at the end of the month are given recognition for their work.

We have found the district representative plan to be very successful and the number of prospects that are turned in is surprising.

Company J—Our present policy for paying salesmen is $100 per month plus $50 per month which is an automobile allowance, plus 7 per cent of the gross sales. Our salesmen sell from $18,000 to $35,000 worth of merchandise each, per year.

On June 15th we will adopt a new policy for salesmen that will be approximately as follows:

We plan to have our salesmen work in groups of five and to be supervised by a group captain who will work continuously in the field for the men in his group.. These men will call upon every single residence on our lines and upon residences that can profitably be served by main extensions. The men will be paid a bonus of $2 per meter for new services and a flat commission amounting to about 13 per cent of the gross sales. The team captain will be paid an over-ride on meters and gross sales.

Company K—We assign appliance salesmen to a given territory and pay a flat salary of $100 per month plus a monthly bonus of 10 per cent, plus 5 per cent commission on sales made.

We have never paid commissions or bonuses to employees other than appliance salesmen for tips or sales, but we are interested in this subject.

Gas *for* Class

By E. L. HALL
Portland Gas & Coke Company

THE Gordon Court Apartments, 530 Montgomery Street, Portland, Oregon, is one of the ultra-modern residential hotel and apartment buildings, erected during the last few years. At the time this apartment house was erected, the regular conservative type of gas ranges in use at that time were installed in sixteen apartments in this building.

At the advent of the modern closed top gas range these old ranges were replaced with modern closed top ranges, having insulated ovens. Shortly after these new ranges were installed the attention of the owner of these apartments was directed to the quiet and economical operation of gas refrigeration. It was not difficult to impress him with the potential possibilities of this type of refrigeration for apartment house use, with the result that the Portland Gas & Coke Company is now installing gas refrigerators in each apartment, replacing old ice boxes.

Incidentally, while making this installation, we learned that the iceman is at times a good booster for gas refrigeration. In this case the apartment building is situated on a very steep hillside, necessitating considerable effort on the part of the iceman to climb from the street to the upper apartments. He said that he was certainly glad to see this apartment discontinue the use of ice, and he knows of others to which he is going to recommend that they follow suit, which he thinks will tend considerably to the better health and longer life of the iceman.

This installation of refrigerators adds a very desirable gas load for the gas company. It is estimated that the average monthly gas consumption will be about 1800 cubic feet per apartment.

NATURAL GAS GASOLINE OPERATIONS

Compiled by E. T. Knudsen

Department of Commerce, Bureau of Mines, Division of Mineral Resources and Statistics

ONE hundred and thirty-seven natural gas gasoline plants with a daily indicated capacity of 1,601,050 thousand cubic feet, report a recovery of 45,538,154 gallons of natural-gas gasoline from 30,703,135 thousand cubic feet of gas treated in June. This is an increase of 1,389 barrels in daily average production.

Utilization of natural-gas gasoline amounted to 1,024, 241 barrels, an increase over May of 76,639 barrels. Daily average utilization of 34,141 barrels was 2,000 barrels less than daily average production of 36,141 barrels.

Stocks of natural-gas gasoline at the end of June amounted to 893,808 barrels of which 32,052 barrels were reported by natural-gas gasoline plant operators and 861,756 barrels by refinery operators. This is an increase of 60,001 barrels over May stocks. This stock figure of 893,808 barrels is approximately 26 days' supply at the current rate of consumption.

Production of gasoline during the month of June amounted to 5,411,413 barrels, a daily average of 180,380 barrels. This is an increase in total production of 252,318 barrels or 4.89 per cent over May output, and an increase of 823,166 barrels or 17.94 per cent over the output of June, 1927.

Of the total gasoline produced, 19,617 barrels were reported as finished gasoline produced by natural-gas gasoline plant operators. Production of gasoline from Cracking Processes increased in June to 499,832 barrels.

Stocks of gasoline show an increase of 136,757 barrels during June and at the end of the month amounted to 11,766,743 barrels. This stock figure includes 80 barrels of finished gasoline reported by Natural-gas gasoline plant operators.

CALIFORNIA NATURAL-GAS GASOLINE PRODUCTION, DISTRIBUTION AND STOCKS

JUNE, 1928

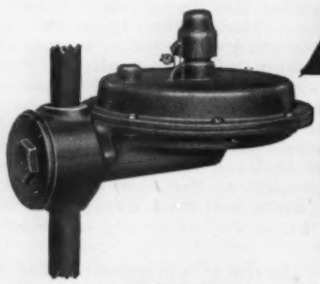
PRODUCTION	Gas Treated M. C. F.	Natural-gas Gasoline Produced (Gallons)	Gasoline Recovery per MCF Gas Treated
Type of Plant			
Oil Absorption	21,974,750	30,537,634	1.390
Compressor	245,303	295,455	1.204
Combination Comp. and Oil Absorption	8,483,082	14,698,386	1.733
Drip	.....	6,679	.....
Totals	30,703,135	45,538,154	1.483

Finished Gasoline produced at plants 19,617 Bbls.

DISTRIBUTION				
Stocks First of Month			833,807	Bbl.
Production during Month			1,084,242	"
Quantity Mixed with crude or unfinished oils	136,007	Bbl.		
Used in Blending at Refineries	789,944	"		
Stocks End of Month	893,808	"		
Used at Plants, Shortage and Evaporation Losses	10,418	"		
Balance			87,872	"
	1,918,049	"	1,918,049	"

STOCKS				
Natural-gas Gasoline held by Natural-gas Gasoline Plant Operators	1,346,178	Gals. or	32,052	Bbls.
Natural-gas Gasoline held by Refiners	36,193,752	"	861,756	"
Totals	37,539,930	"	893,808	"
Finished Gasoline (Motor Fuel) held by Natural-gas Gasoline Plant Operators			80	"

MODEL 10 SERIES
With or Without Mercury Seal



Spring Type
Also furnished in Dead Weight Type

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Gas Control Since 1892

Products for all kinds of Pressure Reduction—for either artificial or natural gas.

GOVERNORS — Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.

REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.

VALVE—Automatic Quick Closing Anti Vacuum.

REYNOLDS GAS REGULATOR COMPANY
Anderson, Indiana

Aerial Surveys *for* Use *in* Locating Gas Lines

(Continued from Page 21)

ritory that is exact in all minor detail, a positive record that often proves invaluable in later argument and study of a completed project.

After construction is complete, the aerial map should go to the operations department. A close study of the line location permits of checking any growing operating hazards as well as allowing the operating staff to familiarize themselves with all of the minor details of the line's particular construction. This department is thus prepared in advance to patrol and to note specific hazards that may be unavoidable or may possibly develop to interrupt the continuous service of the line. Field and office work can be constantly co-ordinated by use of a full detailed map.

LONE STAR EXPERIENCE

Specialized problems of construction and maintenance can be studied and properly visualized by the same process. Recently the Lone Star Gas Company faced the problem of recording the rapid erosion of the north shore line of the Red River just above their new river crossing. The rapid erosion of river-bank farm lands was blamed by owners on some minor obstructions resulting from an earlier river trestle crossing construction work, possibly several hundred yards above their new suspension bridge crossing. The Red River is subject to rapid and excessive changes in stream flow and as the stream carries a very heavy load of suspended sediment and sand, any slight variation in channel velocity causes the deposition or the erosion of these unconsolidated deposits. As a result, the river channel is continually shifting and careful records must be made to assure reasonable safety of structures or banks against unusual erosion due to changes in the stream's flow. Several oblique photographs as well as a map were made of this area for record purposes. One of these obliques is reproduced with this article to show the nature of the erosion and the immediate obstruction due to the existing unstable sand bars in the river bed. A closer study of the map indicates several causes for this erratic erosion of the North bank entirely beyond control of the gas company. Steps have now been taken to counteract these sources of trouble and in all probability, the company may look forward to the satisfactory protection of its valuable property rights as well as the elimination of much friction between itself and land-owners who have previously suffered acreage losses by the encroachment of the stream.

As a result of such economies as those detailed in the foregoing paragraphs aerial photographic methods are rapidly gaining in popularity despite the fact that the degree of precision is limited if speed of delivery, secrecy and cost become the immediate controlling factors. Previous operating experience proves that the essential value of the photographic camp is found in the completeness of and the specific relation of surface conditions rather than the factor of high precision in scale and in direction.

GAS REFRIGERATION ARTICLE IN "NEWS-METER"

"Refrigeration—The Silent Way" was the title of an interesting article by H. W. Elder, appearing in the July issue of the "News-Meter," employee journal of the San Diego Consolidated Gas & Electric Company.

COLOR A FACTOR IN INCREASE OF GAS REFRIGERATOR SALES

Eight to 12 gas-fired refrigerators are being sold each week during the summer refrigeration campaign of the Southern Counties Gas Company on its system in southern California, the campaign having already passed the 65 mark. Beginning April 15 with a quota of 100 refrigerators, the campaign is expected to carry far over that figure. According to C. H. Potter, general commercial agent of the company, color is playing a prominent part in refrigeration selling, about one-third of the Southern Counties' sales being color refrigerators. The line being marketed by the company is available in blue, green, tan and gray.

SOUTHWESTERN PUBLIC SERVICE MAKES ROSWELL OFFER

Southwestern Public Service Company has submitted natural gas rates of 75 cents per thousand for the first 30,000 feet and 60 cents per thousand over that amount for domestic use in Roswell, New Mexico. Commercial rates offered range from 75 cents for the first 30,000 feet to 15 cents, with a 25-cent rate for 30,000 cubic feet to 33,000,000 cubic feet. Providing the company's application is accepted, plans are to furnish natural gas by November 15.

WEBSTER ENGINEERING CO. ANNOUNCES NEW MANAGER

Announcement has been made by the Webster Engineering Company of Tulsa, Oklahoma, of the appointment of L. S. Reagan as vice-president and general manager. Mr. Reagan resigned from the post of chief engineer of the Southwestern Light and Power Company, of Oklahoma City to take the position.

PACIFIC LIGHTING BUYS STOCK OF SANTA MARIA GAS CO.

Pacific Lighting Corporation on July 19 purchased the capital stock of the Santa Maria Gas Company, serving Santa Maria, Calif. No change in company personnel is contemplated, R. E. Easton remaining as manager.

SKELLY OIL COMPANY ERECTING COMBINATION PLANT

Skelly Oil Company is erecting a combination natural gasoline plant and gas lift unit in the Seminole area, near the Earlsboro pool. The plant will have a capacity of three million cubic feet of gas a day and a daily output of 6000 gallons.

PARMELEE GOES WITH LOVELL GASOLINE COMPANY

H. W. Parmelee, general superintendent of the California Gasoline Company for the past three years, has resigned from that post to go with the Lovell Gasoline Company, California Natural Gasoline operator.

WEYMOUTH ASSUMES DUTIES AS OKLAHOMA NATURAL HEAD

Thomas R. Weymouth on July 1, assumed his duties as president of the Oklahoma Natural Gas Corporation, of Tulsa, Oklahoma, upon the retirement of R. C. Sharp.

AWARD SERVICE BUTTONS

The Oklahoma Natural Gas Corporation of Tulsa, Oklahoma, has recently awarded service buttons to employees who have been associated with the company for as many as five years.

TEXHOMA GETS GAS SERVICE

Natural gas was turned into the mains at Texhoma, Texas, early in July, the Texas County Gas Company holding the franchise in that community.

GOODYEAR SUPER CUSHION

Your Demand for a truck tire that possesses greater cushioning power ...greater mileage range, greater ability... all at a much lower cost per mile ..has been ably met in the Goodyear Super Cushion.

Thru its use truck maintenance costs come down ...earning power goes up. You must see this tire to appreciate its advantages. Come in... or telephone, and we will bring one to you for your inspection.

"A Tire for Every Need"

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HEATING--DOMESTIC
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ROBINSON ORIFICE FITTING
TRADE MARK

Why use ROBINSON Orifice Fittings in place of the old-style orifice meter by-pass?

Because:

They save materials
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They save labor
Changing plates is simplified
Orifice is always centered
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Occupy little space
Make for better metering
No hazards
Gas cannot leak, etc.

Write today for new catalog giving complete details and prices.

ROBINSON ORIFICE FITTING COMPANY
1435 SANTA FE AVENUE
LOS ANGELES, CALIFORNIA

ROBINSON ORIFICE FITTING

Large *and* Small Bakeries *as a* Gas Market

(Continued from Page 35)

The sectional or deck type, as has been stated above, is the only one which has offered competition to any extent thus far. There need be no fear, from this source, as in practically every case, gas is vastly cheaper.

Finding the most effective sales procedure to follow probably constitutes the important factor in securing the bakery business, and requires careful thought and study. It is a well-known fact that it is most difficult to compete with coal, coke, oil or wood on a straight fuel cost basis and it is indeed wise not to get into a detailed discussion with the prospective customer on this point.

Talk in terms of uniform heat, ease of operation, cleanliness, convenience, no storage of fuel and improved quality of the baked product. An effort should be made to capitalize on these points and, if possible, permission should be obtained to put in a trial installation. With a trial installation the burden of proof then rests with the industrial salesman and his best sales effort should be the result.

The bakery business is highly desirable from our company's standpoint and the best talent available is necessary in order to cope with the many difficulties which are usually encountered.

Look over your territory and make plans to secure some of this business.

Using *the* Indicator *in* Gas Engine Work

(Continued from Page 23)

Card No. 6 is a compression card indicating bad leakage, since the expansion line is below the compression. Obviously these lines should practically coincide if the cylinder and valves are in good condition, although if operating temperatures are high the expansion line will be slightly above the compression line due to the heat absorbed from the piston, cylinder and valves. They are usually taken with a 60 lb. or 70 lb. spring and are chiefly valuable in determining the condition of the rings in double acting engines.

UNIFORM ACCOUNTS ADOPTED BY IDAHO COMMISSION

On July 6 the Public Utilities Commission of the State of Idaho, meeting in Boise, adopted the uniform classification of accounts for gas utilities prepared by the Committee on Statistics and Accounts of Public Utilities of the National Association of Railroad and Utilities Commissioners. Evidence submitted at the hearing shows that all gas utilities within the state of Idaho desired to have this classification adopted, and that it is at the present time in universal use by gas companies in the state.

"SCHOOL DAYS"—L. A. G. AND E EMPLOYEE ASS'N. COMIC HIT

"School Days," a musical comedy hit produced by members of L. A. Service Group, the employee organization of the Los Angeles Gas and Electric Corporation, has been much in demand. Produced for the first time at the Association's birthday party held July 10 at the Breakfast Club, the comedy on general demand was given twice again in the company auditorium, July 20 and 23, for those unable to view it earlier.

SUPERBO AUTOMATIC STORAGE WATER HEATERS

Manufactured in Los Angeles Since 1914

Superbo "Safety"

A Quality Product

FEATURING: — Dual Safety Control — Detachable Heating Unit—Safety Gas Shut-off.

No. 1—22 gallons . . . $ 97.50
No. 2—30 gallons . . . 125.00
No. 3—40 gallons . . . 150.00
No. 4—66 gallons . . . 250.00

Prices F. O. B. Factory

Manufactured by

Superbo Mfg. Co.
Los Angeles California

San Diego Company Serves Waterless Gas

(Continued from Page 31)

duced to atmospheric pressure and temperature.

Dehydration by compression is ideally adapted to our plant as we were already compressing about 65 per cent of our gas, and in order to care for our heavy winter loads our compressor capacity must be greatly in excess of our average demands. Thus it was necessary to install only increased gas cooling facilities and operate the compressor station at an increased load sufficient to supply the demands of the low pressure system.

A connection from the high pressure system to the low pressure system through regulators has been provided. On April 10th, 1928, this system, partially completed, was put into operation and all gas supplied by our plant is now being compressed and dehydrated.

With from 20 to 60 pounds pressure per square inch at the compressor station, gas is delivered to the low pressure system at 6½ inches water column. This is accomplished by the regulator station shown in Figure 3.

To guard against a possible loss of gas in the low pressure system due to a failure of supply from the compressors, or other emergency the large regulator at No. 4 holder (Fig. 4) is set to open automatically at 6 inches pressure water column The 6½ inches pressure supplied from the compressor room holds this regulator at the holder closed allowing only dehydrated gas to enter the system but with an insufficient supply the decreased pressure—to 6 inches—allows this regulator to open and permits gas to flow from the holder into the system.

Figure 1 shows a view of the compressor station.

Figure 2 shows the gas coolers in place.

A counter current flow of sea water is used in the coolers bringing the temperature of the gas down from an average of about 250° F. to 75° F.

The water removed from the bottoms of these coolers will approximate about one-third gallon per thousand cubic feet of gas, extracted from the gas itself. There is no connection between the gas and cooling water.

The increased cost due to this method of dehydration will approximate two cents per thousand cubic feet on 35 per cent of our total sendout and it is believed will result in a great saving in the cost of maintaining the distributing system, decrease the annoyance to the public of tearing up streets, etc., and give to the consumer a service even more satisfactory and free from possible interruption than is now enjoyed.

Facts Controvert Fancies When It Comes *to* Heating

(Continued from Page 32)

It is particularly gratifying to note the satisfactory results being obtained from the gas heating installation as noted in the third paragraph of the consumer's letter, and to realize that in this customer we have another booster for gas as a heating agency and one who is perfectly willing to publish to the world the demonstrable fact that gas is the best fuel obtainable.

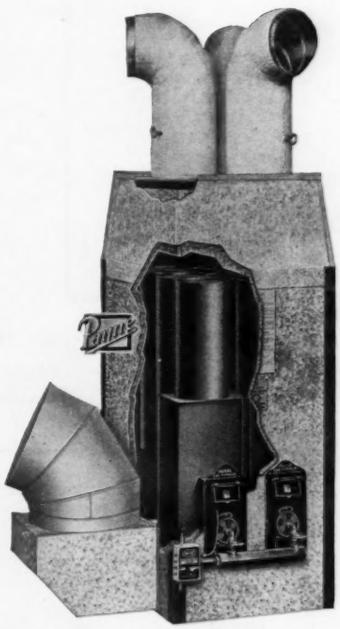
GAS FOR SNYDER, TEXAS

The Community Natural Gas Company of Dallas, Texas, recently completed a gas distribution system in Snyder, Texas.

Here Are Three Reasons Why

Payne Unit Furnaces

Are Your Best Bet



1. **They are made of special rust-resisting iron.**
2. **They have proven their strength, durability, and efficiency by actual laboratory test.**
3. **Over Forty Thousand customers are expressing satisfaction in their performance.**

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Main Office, 338 Foothill Road, Beverly Hills, Calif.
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A full line of Air and Gas Equipment

Air Compressors	Cameron Pumps
Portable Compressors	Gas Compressors
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FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for

GENERATOR LININGS
CHECKERS
BOILER SETTINGS

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WORKS:
Stockton,
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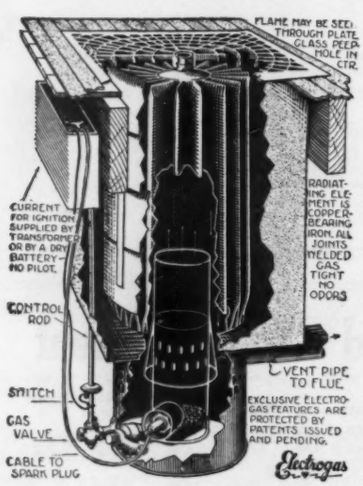
ELECTROGAS

it's matchless!


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CONTROL ROD
VENT PIPE TO FLUE
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GAS VALVE
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
CABLE TO SPARK PLUG
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—a good floor furnace
—approved by A. G. A.
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SAN FRANCISCO

The Cleveland Trencher Company

"Pioneers of the Small Trencher"

20100 ST. CLAIR AVE.
Cleveland, O., U.S.A.

Getting *at* True Cost *of* House Heating

(Continued from Page 25)

the gas rate necessary to make the cost of gas heating equal to that of coal or oil.

At the present time about 50 per cent of the oil used in domestic oil burners is 38°-42° furnace oil, 40 per cent is 28°-32° light fuel oil, and 10 per cent is 24° fuel oil. These oils are generally most expensive on the east coast and decrease in price to a minimum on the west coast; the price of 38°-42° furnace oil ranges from 10 cents a gallon in the east, to 6 cents in the west; the 28°-32° oil from 9 cents to 5 cents, and the 24° oil from 8 cents to 4 cents. These prices are for tank wagon delivery; oil sold in smaller quantities will range 2 to 3 cents a gallon higher in price.

COSTS ABOVE FUEL EXPENSE

To the cost of fuel must be added the other expenses of house heating; the interest on the investment will be considered first. An average price for a mechanical draft oil burner completely installed with its control and a 1000-gallon tank is $900. With an inside 275-gallon tank an average price would be about $450, but this installation is not permitted in many towns and in any case, would be subject to the extra price of oil for less than tank wagon delivery, as well as the additional dirt and oiliness it would bring into the house. Added to the cost of the oil burner is a $300 charge for the boiler; the interest on the total amount of $1,200 at 6% is $72 yearly. A gas boiler and thermostat installed would average $600 in cost, with an interest charge of $36. For a coal boiler costing $300, the interest charge would be $18.

Depreciation on coal and gas boilers is usually figured on a 20-year basis, on oil burners on a 10-year basis This is because the oil burner, still in the development stage, will be obsolete in 10 years and will have to be replaced to obtain the increased efficiency of types yet to be designed. The depreciation and obsolescence charges, then will be $120 for the oil burner $30 for the gas boiler, and $15 for the coal boiler.

Another item is the auxiliary power for the oil burner, a ¼ or ½ horse power electric motor and usually a gas pilot. A figure to cover this would average $25; coal and gas furnaces, of course, use no auxiliary power.

CARE OF FURNACE ELIMINATED

The care of a coal furnace is certainly worth notice; even if the owner is also the caretaker, the time he spends is surely of some value. While it may be considered as a low figure, the service of a caretaker or the time of the owner will be considered as $10 per month, or $60 per season. Oil and gas heaters being automatic in operation. have no corresponding service charge.

Interest on the stored fuel, say on a yearly consumpton of 10 tons of coal at $12 per ton, or 1600 gallons of oil at 9 cents per gallon would be close to $4. Gas, of course, will be exempt from this charge.

For the maintenance charges on oil burners a fairly high figure must be set, inasmuch as they are fast running machines working under severe conditions. Coal boilers require repairs and servicing in the form of cleaning the flues and chimneys, and replacing broken grates, as well as other minor matters. The maintenance of a gas boiler is inconsiderable An average of various estimates for maintenance is $25 per year for oil burners, $10 for coal boilers and $5 for gas boilers.

The space that a gas boiler frees for other purposes is worth $2 a month or $24 per year, and this amount should be charged against the coal boiler, which practically excludes the use of the cellar for any other purpose. While oil burners are much cleaner than coal furnaces, soot is often formed in them and is blown about by the pop when the burner ignites or is extinguished. Because of this and of the noise, the oil burner and furnace often render the basement useless for other purposes but if the oil burner is separated from the rest of the basement, partial utilization may be realized and a charge of, say $12 should be made against it. A gas boiler allows the use of practically the whole cellar for any desired purpose, and no rental charge need be applied.

Because of the cleaner fuel, a house with a gas-fired boiler will need less cleaning than a house using oil or coal for heating. Assuming $100 a year for cleaning, a $20 reduction for gas-fired boiler and $10 for oil-fired boilers may be safely allowed. This will mean a $20 yearly charge against coal and $10 against oil with a zero charge for gas These figures are not the costs of housecleaning when burning the different fuels; they are merely the costs of housecleaning when coal or oil is burned, over the cost of housecleaning when gas is the source of heat.

Itemizing these figures we obtain the following table which may be applied to houses of from six to ten rooms, and which, of course, may be changed to fit local conditions:

	Coal	*Oil*	*Gas*
Interest on Investment	$ 18	$ 72	$ 36
Depreciation and Obsolescence	15	120	30
Auxiliary	.....	25	.....
Labor of Firing	60	.....	.....
Interest on Stored Fuel	4	4	.....
Repairs and Service	10	25	5
Rent for Space Occupied	24	12	0
Extra Housecleaning Charge	20	10	0
Total	$151	$268	$ 71

These totals, it must be agreed, are charges that should logically be added to the cost of fuel to determine relative heating costs. Assuming the conditions given on the oil-gas alignment chart, and 1,350 gallons of oil and 233,000 cubic feet of gas for a season's fuel consumption, the total heating for gas will be:

233,000 in cubic feet at 55c/M.....$128.00
Interest, depreciation, etc., as above.... 71.00

Total cost of heating, per year.....$199.00

Similarly for oil:
1350 gallons at 12c/gallon.....$162.00
Interest, depreciation, etc., as above.. 268.00

Total cost of heating, per year.....$430.00

In this particular instance, oil heating costs more than twice as much as gas heating and would still be more expensive even if the price of the fuels were radically altered.

In a like manner using the example on the gas-coal alignment chart, we have the following for coal:
10 tons of coal at $15.25/ton.....$152.50
Interest, etc., as above..... 151.00

Total cost per year.....$303.50

And for gas:
246,000 cubic feet at 80c/M.....$196.80
Interest etc., as above..... 71.00

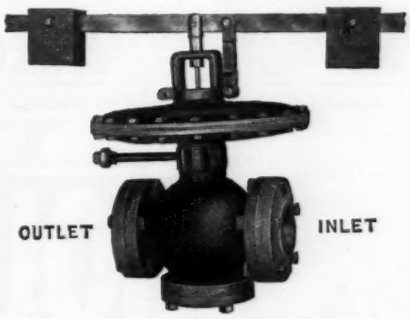
Total cost per year.....$267.80

Thus gas is in the house heating field and competing with other fuels on a price basis.

For District or Individual Service—
The Fulton Weighted Illuminating Regulator

It is designed to reduce a medium pressure of 15 pounds or less to any given delivery pressure between one ounce and five pounds.

This is but one of the valves described in our catalog. Sent on request.



The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service. 1 oz. up to 1,600 lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

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1855 Industrial Street Los Angeles

W P & S

DESIGNERS, FABRICATORS & ERECTORS OF PRODUCTS OF **STEEL**

Investigate WESTERN Hi-Pressure Unit Gas Holders

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FACTORIES · LOS ANGELES · SOUTH SAN FRANCISCO · FRESNO · PHOENIX · TAFT

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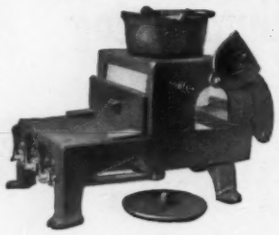
For your soldering jobs!



No. 118 Furnace

For your heat-treating jobs!

For your metal-melting jobs!

JOHNSON

No. 118 Bench Furnace

One of the most useful and practical bench furnaces on the market. Will perform a variety of profitable duties—heat soldering coppers, heat-treat, and melt soft metals. Write for full details of this stout, efficient furnace.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative—C. B. Babcock Co.
135 Bluxome Street San Francisco, California

Get an Option on Future Customers!

supply them with

ROCKGAS

A form of pure natural gas liquified under pressure in convenient sized tanks. Smallest, 12x37 inches, holds equivalent of 2666 cu. ft. 500 b.t.u. gas. Largest, holds equivalent of 36 550 cu. ft. of 500 b.t.u. gas. Many other sizes.

Pave the Way for Gas Extension

Install ROCKGAS in places where natural or artificial gas is not available. Give temporary service now, pending further extension of your gas mains. ROCKGAS now used and endorsed by homes, camps, stores, etc. throughout the United States.

A few rich California territories open for distributors. Write today for full details.

IMPERIAL GAS CO.
3190 Walnut St.
(Sta. B, Box 3028)
Long Beach, California

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

And who can set a value on the feeling of relief of the householder who knows that, despite the weather, his house will be warmed to any degree he desires without his moving a hand to make it so?

Gas Administration

(Continued from Page 27)

demands for such operations, in accordance with contractural agreements necessarily entered into between the oil operator and the gas utility. In order to assure itself of an adequate supply of natural gas to meet peak demands, the natural gas utility must contract to take such supply throughout the year, utilizing as best it can, the surplus supply during the summer months of low domestic and commercial demand. In order to secure this supply it is necessary for the distributing utility to install and maintain gas transmission lines and pumping compressor stations in the fields. The determination of the advisability of such installations and their capacity is a difficult problem, due to the fact that many of our California fields are drilled up rapidly, thereby producing a flush production which quickly increases to a maximum, and rapidly declines to a much lower production. This was noticeably true at Santa Fe Springs and Seal Beach.

At the present time the distribution of natural gas for domestic, commercial and industrial purposes is limited to Southern California, with the Los Angeles Basin as the area of largest consumption. Natural gas is brought into this area from the Ventura Avenue field, the Los Angeles basin fields, and also from the Kern County fields.

LINE CAPACITIES

The quantity of this gas that can be brought in daily is limited by transmission line and compressor plant capacities, as well as by the amount available in the fields. There are two 12-inch lines and one 16-inch line from Ventura Avenue field to the Los Angeles Basin that have a combined delivery capacity of 115,000,000 cubic feet per day at 400 lbs. pressure. The lines from Kern County can deliver 25,000,000 cubic feet per day, and the lines from the Los Angeles Basin fields can deliver 120,000,000 cubic feet per day more, making a total of 260,000,000 cubic feet per day. However, this much gas is not always available and at times of heavy domestic demand it is necessary to cut off a portion of the industrial load in order to satisfy the domestic requirements.

Peak hourly demands and peak daily demands of the domestic consumer in California vary over an extremely wide range. This condition is probably due to the fact that the bulk of the space-heating and water-heating requirements are supplied by gas fuel. The ratio of maximum hourly demand and minimum hourly demand has varied as much as 28 to 1, while the ratio of the maximum daily demand and the minimum daily demand has varied as much as 6 to 1.

The peak day of the year 1927 occurred on December 21st, 1927 during which the natural gas sendout in the Los Angeles metropolitan area alone was in excess of 233,000,000 cubic feet per day. During this day one of the larger gas utilities had a peak hourly demand of 7,500,000 cubic feet per hour. This peak was met by the curtailment of some of the industrial load and although the oil gas plants of the utilities

were hot and ready to manufacture oil gas, it was not found necessary to operate these plants. Adequate pressures and a gas quality in excess of 1080 B.t.u. per cubic foot were maintained.

An emergency situation arose at the time of the St. Francis Dam disaster when two of the 12-inch lines from Ventura Avenue field and the two 12-inch lines from Kern County were washed out, thus cutting off a daily delivery capacity of 86,000,000 cubic feet of gas to the Los Angeles Basin. This emergency was promptly met by the curtailment of industrial load which immediately went over to oil fuel, and by the very efficient co-operation of the gas utilities involved.

CONCLUSIONS

The industry of gathering, transmitting, and distributing natural gas, under the conditions as outlined above, constitute a very complex and complicated problem. The factors of variable supply, indefinite life of source, varying pressures and qualities of gas, surplus and deficient availabilities, necessary contractural obligations, not to mention extreme variations in demand due to weather conditions, with the consequent wastage of surplus gas during hot weather, coupled with the rigidity and non-flexibility of natural gas service, all tend to increase the difficulties attending this service.

The working out of these problems and the rendering of continuous high standard service in Southern California can be attributed mainly to the excellent co-operation that has developed among the utilities rendering such service.

SCHRYBER MADE MANAGER OF OGDEN GAS COMPANY

A. W. Schryber, formerly sales manager of the Utah Gas and Coke Company, Salt Lake City, is now manager of the Ogden Gas Company, of which E. A. Angley, vice-president and general manager of the Utah Gas and Coke, is president.

REORGANIZE SIGNAL GASOLINE COMPANY; NEW CAPITAL

Signal Gasoline Company of Los Angeles was reorganized in July, a new firm, the Signal Oil & Gas Company, capitalized at 10,000,000 being formed in its place. The company now operates six absorption units at Signal Hill, with a total daily capacity of 150,000 gallons.

HUTCHINSON LEAVES STANDARD FOR EQUIPMENT COMPANY

Early in July, A. J. Hutchinson, research engineer in the field of natural gasoline for the Standard Oil Company of California, left that organization to become associated with the Engineering, Research & Equipment Company of Los Angeles and Dallas. He will serve as research engineer with the new firm. C. E. Golden takes Mr. Hutchinson's place with the Standard.

CITY OF OMAHA ANNOUNCES NEW BIDS OFFERED

The city of Omaha, Nebr., opened new bids for the construction of a gas line from Texas gas fields to Omaha on July 25th, the line to furnish as much as 112,000,000 cubic feet of gas every 24 hours and to be not less than 24 inches in diameter. Specifications further provide that the line must be completed by September 25, 1929.

Each bidder will be required to post a bond of $500,000 and the winning bidder will be required to put up a $1,000,000 bond to guarantee fulfillment of the contract.

Beat the Pipeline's Greatest Enemy!

Do these two things . . . keep water and moisture away from your pipelines . . . and keep them away for the life of the pipelines. Then you will not have to pay the price of corrosion.

For where there is no moisture or other electrolyte in actual contact with the metal there can be no corrosion. And where the pipe is covered with PIONEER RUBBERTEX there can be no contact with water.

And PIONEER RUBBERTEX lasts and lasts and lasts . . . because the materials combined to give it that tough, resilient body are unharmed by soil, temperatures or long exposure.

PIONEER PRODUCTS

Pioneer
RUBBERTEX and PIPE COVERING

PIONEER PAPER COMPANY, INC.
Established 1888
55th & Alameda
LOS ANGELES, CAL.
DElaware 2111
San Francisco Portland
Seattle Spokane
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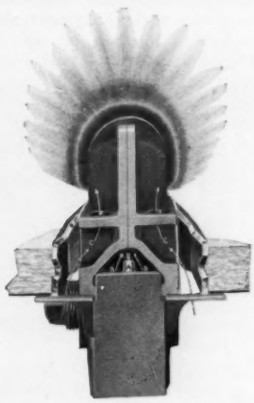

The gas burner with a snappy, high temperature flame

Rotary Manufacturing Co.
5720 Long Beach Avenue
LOS ANGELES

WE NEVER MAKE A PROMISE . . . UNLESS WE ARE POSITIVE WE CAN KEEP IT. FRANKLY, WE WOULD RATHER LOSE A CLIENT THAN DISAPPOINT HIM EITHER ON THE QUALITY OF *ARCO* PAINTS AND PROTECTIVE PRODUCTS . . . OR ON GETTING HIS ORDERS TO HIM ON TIME. YOU CAN DEPEND ON *ARCO* TO MAKE GOOD EVERY PROMISE.

THE ARCO COMPANY

CLEVELAND, OHIO

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Branches and Warehouses in Principal Cities

(196)

ARCO

Paints . Varnishes . Enamels . Lacquers

Public Relations Section Stunts Night

(Continued from Page 29)

JUDGING

The stunts will be judged by persons not connected with any of the competing companies, on the following scale of points for a perfect production:

Portrayal of theme (see above)	30 points
Acting	30 points
Stage Settings and Properties	10 points
Costumes	10 points
Entertainment Value	20 points

INFORMATION REQUIRED

Persons responsible for the production of stunts in their own companies are requested, as soon as possible, to send the title, cast of characters, and such other information as is usual, for the purpose of preparing a detailed program for the meeting. This information is to be sent to the undersigned chairman of the Public Relations Section.

STAGE AND EQUIPMENT

A suitable stage and the necessary equipment for producing these stunts will be found at the Convention Hall.

For further information apply to D. L. Scott, Chairman Public Relations Section, c/o Los Angeles Gas and Electric Corp., Box 1100, Station C, Los Angeles, California.

Convention Three-Minute Speaking Contests

(Continued from Page 29)

RULES

Contest for Gas Company Employees—Tuesday Noon, September 18

Subject—"Gas, the Aristocrat of Fuels." Open to employees of Gas Companies, except major department heads, executives, and division and district managers. Each company entitled to one entrant only.

Contest for Class B. Members—Thursday Noon, September 20

Subject: "Gas Range and Water Heater, the Genii of the Kitchen." Open only to employees of firms holding Class B membership in the P. C. G. A. Each company entitled to one entrant only.

Contest Between Winners in Foregoing Contests—Thursday Evening, September 20

Subject: "What Can the Gas Company Do to Popularize Gas Service?"

Prizes: Suitable prizes will be awarded to the winners in all three contests.

Length of Speeches: Contestants may not speak longer than three minutes. Judges will use their judgment as to penalty for referring to notes, or reading.

Judging: Speeches will be judged on the basis of five qualities:

(1) Thought Value	25 points
(2) Clearness of Presentation	25 points
(3) Diction	15 points
(4) Articulation	15 points
(5) Poise and Audience Appeal	20 points
Total	100 points

Items (1) and (2) will be based on a study of the manuscripts; items (3), (4) and (5) on the oral presentations. One set of judges will be selected to judge the manuscripts and another set for the oral presentations.

Time of Entrance: Manuscripts must be submitted not later than Monday, September 10, 1928, to the Luncheon Speaking

GAS or WATER Connections

whether screw thread or gasket, should be made up with KEY SPECIAL PIPE JOINT COMPOUND.

KEY SPECIAL PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

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Distributors in all principal cities.

WRITE FOR FREE SAMPLE

Chairman, D. L. Scott, c/o Los Angeles Gas and Electric Corporation, Box 1100, Station C, Los Angeles, California.

Manuscripts: Manuscripts must be on plain paper (no letterheads or other means of identifiction) and unsigned. The name of the contestant accompanying the manuscript should be enclosed in a plain sealed envelope.

Definitions:

"Thought Value" refers to the quality and value of the ideas advanced, regardless of mode or style of expression.

"Clearness of Presentation" refers to the lucidity and force of the manuscript, regardless of grammatical structure.

"Diction" refers to grammatical structure and precision of statement.

"Articulation" means the clearness and correctness of pronunciation.

"Poise and Audience Appeal" refers to the speaker's ease and manner in the presence of his audience, and the attention and response of the audience.

Note: Judges will disregard applause in grading addresses, for the reason that applause reflects such elements as the personal popularity and acquaintance of the speaker with members of the audience, and also preferences based on company affiliations, as well as the quality of the addresses.

RESERVE NATURAL PURCHASED BY ARKANSAS OPERATOR

The Dixie Gulf Pipe Line Company has announced sale of its half interest in the Reserve Natural Gas Company to the Arkansas Natural Gas Corporation, which gives this company full control over the pipe line extending from Shreveport to Houston and Port Arthur. The Arkansas Natural purchased a half interest in the property last year for approximately $2,000,000, and the deal just consumated is said to amount to $1,200,000.

GAS COMPANY BY-PRODUCT FINDS GOLF COURSE USE

F. W. Smelts, by-products merchandise manager for the gas department of the Brtiish Columbia Electric Railway Company, announces that this company is establishing a good market for sulphate of ammonia. This by-product is now being used by golf clubs in the vicinity of Vancouver, and the ground supervisers have expressed their complete satisfaction. Sulphate of ammonia is also being used for private lawns.

NORTHERN PUMP CO. LINE SOLD ON COAST BY KING-KNIGHT

Northern Pump Company, Minneapolis, Minn., is now manufacturing the Northern Double Packed Valve, distribution of which on the Pacific Coast will be handled by the King-Knight Company of San Francisco.

METTLER OFFICES MOVED

The Los Angeles offices of the Lee B. Mettler Company, manufacturers of gas burners, have been moved to larger quarters within the San Fernando Building, at 406 South Main St. Rooms now occupied by the company are numbered 818, 819, 820, 821.

MacTHWAITE GAS CO. WILL SELL GAS REFRIGERATORS

Servel Sales, Inc., through H. W. Foulds, general sales manager, announces the appointment of the MacThwaite Gas Company, Ada, Okla., as a dealer for Servel and Electrolux refrigerators.

We are now prepared to furnish

Reliance Balanced Valve Regulators

In sizes up to four inch for both high and low pressure delivery.

It will be interesting and profitable to you to investigate the merits of this new device.

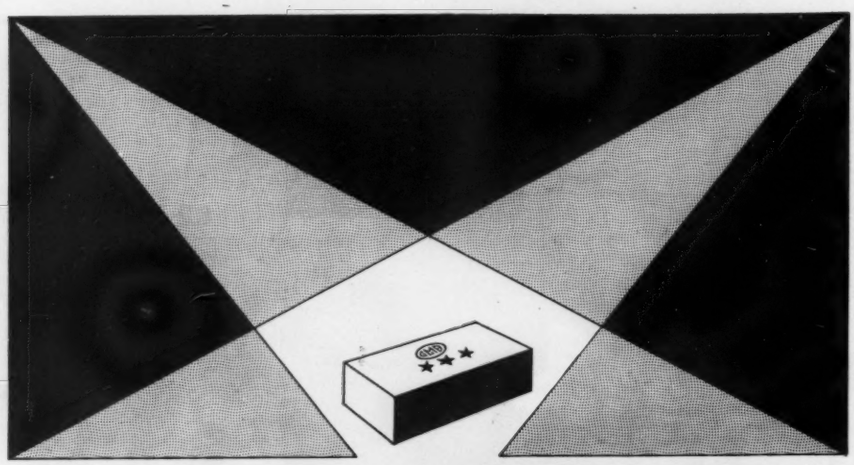
Reliance Manufacturing Company

ALHAMBRA, CALIF.

Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

406 S. Main St. LEE B. METTLER CO. Los Angeles Cal.



FIRE BRICK

LININGS, CHECKERS and BOILER SETTINGS are carried in stock for quick shipment. If special or hand-made shapes are required, our plant is especially equipped to make them.

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PORTLAND SEATTLE

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Stauffer's

FERROX

Purifier

meets these essential requirements of a good Gas Purifier

A highly active Iron precipitate, with a high Iron content.
A thoroughly impregnated and porous bulky mass, ready to use, no delay, always uniform.

A dependable source of supply

Pioneer manufacturers of Industrial Chemicals on the Pacific Coast

Stauffer Chemical Company

624-638 California Street, San Francisco, California

THIRD LINE BETWEEN OTTAWA AND KANSAS CITY

With its 132-mile extension of the 20-inch line between Ottawa and Wichita already constructed, plans are announced by the Cities Service Gas Company for a third 16-inch pipeline between Ottawa and Kansas City.

Two new compressor stations are also to be built along the route of the 20-inch natural gas pipeline from Pampa, Texas to Ottawa, Kansas. One 5,000 horse power station is to be erected near Higgins, Texas, and another of the same capacity near Corwin, Kansas. When the projected enlargements and additions are made the stations along the 20-inch line from Pampa to Wichita will have a total of 27,000 horse power.

DIXIE AND SOUTHERN CITIES EXCHANGE PROPERTIES

The gas distribution system at Cedar Grove, La., which has been operated by the Dixie Gas & Fuel Company, is now operated by the Southern Cities Distributing Company, following an agreement with the Moody-Seagraves interests.

In the same deal, the franchises and distributing plants formerly operated by the Southern Cities company at Marshall, Texas, and Longview, Texas, were taken over by the Moody-Seagraves interests together with other properties at Waskom and Bethany. An exchange of stock made the arrangement possible.

REPORT LINE TO ENID FROM WHEELER COUNTY FIELDS

The Consolidated Gas Utilities Company of New York, according to a news report, is surveying for a 14-inch gas line from the gas fields of Wheeler County, Texas, to Enid, Oklahoma, to connect with lines supplying north central Oklahoma, and south-central and southeastern Kansas.

Through a recent merger this company now owns the Midwest Gas Company, Blackwell Pipe Line Company, Oklahoma, Northern Utilities Company, and the Oklahoma Gas Company.

P. G. AND E. EXTENDS MAINS TO COUNTRY CLUB

Approval of an agreement has been given by the California Railroad Commission between Pacific Gas and Electric Company and the Sequoyah Country Club of Oakland, which provides for the extension by the company of its gas mains to the country club at a cost of approximately $5,287. The club agrees to pay a minimum charge of $1,500 dollars per year for a period of three years from and after completion of the extension, for gas service.

FIRST SHIPMENTS FOR NEW PLANT OF B. C. ELECTRIC

The first shipment of machinery and equipment of the new water-gas plant of the British Columbia Electric Railway Company, including carburetor and superheaters, has now arrived in Vancouver from London, and as the foundations for the new 3,500,000-cubic feet daily capacity gas plant have already been laid, the work of assembling the machinery, and erecting the superstructure, can go forward. December 1 is the set completion date for the project.

JEFFERSON PARISH NOW HAS GAS FROM MONROE FIELDS

Natural Gas will now be delivered to towns in Jefferson Parish, Louisiana, following the recent completion of a gas line to the border of the parish. The Louisiana Power and Light Company is bringing the gas from the Monroe fields, through the mains of the Southern Gas and Fuel Company.

ASK BOND TO INSURE LITTLE ROCK GAS SUPPLY

The Arkansas Natural Gas Corporation has been asked by the City Council of Little Rock, Ark., to post a $50,000 bond as a guarantee that the city will be supplied with a sufficient amount of gas to meet the peak demand during the winter months. Arkansas Natural supplies the gas to the local distributing agency, the Little Rock Gas & Fuel Company.

George W. Donaghey is also seeking a gas franchise with the city.

MOODY-SEAGRAVES INTERESTS PURCHASE ESPERSON BLDG.

For a consideration of $5,003,000 the Moody-Seagraves gas interests of Houston, Texas, have purchased the Neils-Esperson building of that city. The building rises to a height of 411 feet and is the city's tallest structure. Payments on the building, according to the plan of purchase, will be made in 23 annual installments.

NEW TRADE BOOKLET ON PUMPS NOW ISSUED

The A. S. Cameron Steam Pump Works of the Ingersoll-Rand Company, New York, manufacturers of the Cameron Multi-Stage Centrifugal Pumps, has issued an attractive booklet describing this equipment. Sections on specifications covering Cameron HST and HMT Centrifugal Pumps, two, three, four, five, and six stage, are included.

LONE STAR GIVES HUGO, OKLA. ANOTHER CHANCE FOR GAS

Hugo, Oklahoma, has been given another opportunity to secure natural gas through obtaining a sufficient number of paid meter deposits. The figure set by the Lone Star Gas Company is 650. The city failed to meet the quota which was set them last year.

NEW INDUSTRIAL RATE IS FILED FOR BOISE

A new industrial rate schedule has been filed with the Public Utilities Commission of Idaho by the Boise Light & Coke Company, the rate stepping down from $2 per thousand for the first 3,000 cubic feet to 80 cents per thousand for all over 30,000 feet.

EMPIRE GAS MAY SERVE GAS TO FORT LEAVENWORTH

Fort Leavenworth, Kansas, will be piped with natural gas within the next few months, according to recent report, the gas to be supplied by the Empire Gas Company, a subsidiary of the Doherty interests, who have made application to construct a branch line to the government reservation.

RULE ON GAS VENTING IN PUEBLO, COLO.

On July 9 city commissioners of Pueblo, Colo., passed an ordinance calling for erection of a ventpipe without a damper, leading to outside of buildings wherever gas is used.

LONE STAR HAS FRANCHISE IN PALMER, TEXAS

The Lone Star Gas Company has recently been granted a gas franchise at Palmer, Texas. A gas line will be extended to the city from Ferris, Texas, seven miles north.

APPLIES TO SERVE TOWN OF TOPPENISH, WASH.

Dr. N. P. Bloxham of Yakima, Wash., has entered application for a franchise to install and operate a gas plant and distribution system in Poppenish, in the same state.

SPRAGUE METERS

Represent Twenty-five Years of Progress

We are proud of our Service in the West

Sprague Meter Company

BRIDGEPORT, CONNECTICUT

Los Angeles, California — San Francisco, California

Davenport, Iowa — Houston, Texas

HOT-N-KOLD

The Hot-N-Kold Shops are now serving the public in eight cities in the northern part of California with Kelvinator Refrigeration, Holbrook Ranges, Welsbauch Water Heaters, and other major appliances.

A valuable business franchise awaits the right dealer in every town.

HOT-N-KOLD CORPORATION

949 Mission Street — **San Francisco, California**

GILFILLAN
Dual Control Valve Regulators

SAVE ONE INSTALLATION

Maintain a constant steam pressure on the boiler
and
Reduce and maintain an unvarying gas pressure to the burner regardless of the variation in line pressure.

Built to control Boiler pressure from one pound to 200 pounds steam, and deliver as low as two ounces gas pressure at the burner.

Write for literature

GILFILLAN MACHINE WORKS, Inc.
Ebenezer, Erie Co., N. Y.

Representatives
Jensen Instrument Co., 624 E. Fourth St., Los Angeles, Calif.
Gas Appliance Service Corp, 2014 Bryan St., Dallas, Texas.
The Diamond Supply Co., Charleston, W. Va.

The Magic Way Company

Gas Heating Devices

including

"Magic Way" Gas Furnaces
"Magic Way" Control Valves and Switches
"Potter" Radiators
"Steel Made" Radiators
"Cole" Floor and Wall Heaters
"Hall" Floor Furnaces

Manufactured by

Magic Way Company
National City San Diego California

SIX SALES ESSENTIALS *ARE* STRESSED BY WHITWELL

SPEAKING before the first annual convention of the Pennsylvania Natural Gas Men's Association, George E. Whitwell, manager in charge of sales and service department, Equitable Gas Company, and a vice-president of the Pennsylvania Association, in his speech on "Modern Methods in the Development of Gas Sales" broadcasted six essential points in salesmanship that are worth passing on.

Quoting Mr. Whitwell:

"The first principle is, if you want to win a business argument do not talk too much.

"The second principle is, if you want to win a business argument, do not interrupt.

"The third principle is, do not argue.

"The fourth principle is, if you want to win a business argument, find out what the other man's objections are. Perhaps you spend a lot of time selling him something he is already sold on and too little time on things that are important.

"The fifth principle is, see that any objection that the customer offers is repeated in your own words, so that he may understand that you understand his objection.

"Repeat the objection of the customer so that he may know you understand, and finally, try to concentrate on overcoming the customer's objection."

GALVESTON COMMISSIONERS RULE ON GAS RATES

The Board of City Commisioners of Galveston, Texas, recently voted for the following prices on gas to go in effect after the necessary publication of the ordinance: 75 cents per 1000 for the first 3000 cubic feet; 72½ cents per 1000 for the next 5000 feet; 70 cents per 1000 per for the next 7000 cubic feet; 65 cents per 1000 for all gas over 15,000 feet. The ordinance also provided a service charge of 50 cents.

Another ordinance adopted provided that, "After 60 days any firm engaged in the business of furnishing natural gas shall be subject to forfeiture of franchise unless the product supplied has an average heat content of not less than 900 B.t.u.'s." Emergencies and the failure of companies to properly adjust burners and equipment are exceptions to the ordinance. A third ordinance provides that a fine of $200 be invoked for serving gas with varying heat value in different sections of the city. Exceptions to this are made during times of change-over from artificial to natural gas. Another exception is made for contracts already in effect with industrial firms at the time of the passing of the ordinance.

UNITED PUBLIC SERVICE CO. MAKES UTILITY PURCHASE

Announcement has been made of the purchase, by the United Public Service Company of Chicago, of the stock of the Sequoyah Oil and Gas Company of Oklahoma, the Crow Oil and Gas Company of Arkansas, and the Border Gas Company, also of Arkansas, and the assets and property of the Eureka Oil Company, a Delaware Corporation. The purchase became effective around July 1st.

The deal includes the gas distribution plant at Sallisaw, Oklahoma, together with the line which brings gas to that city from the Gans, Okla., field, 6,000 acres of gas leases and four gas wells in the Gans field, and the recently granted franchise of the Border Gas Company to supply gas to Fort Smith, Ark. The company plans, it is reported, to begin the construction of a gas line from the Gans field to Fort Smith early this fall. Offices will be maintained by the company in Fort Worth.

HOUSTON COMPANY REDUCES SUMMER INSTALLATION RATE

As an inducement to home owners to install gas equipment before the winter months the Houston Gas and Fuel Company of Houston, Texas, is offering a special discount price on all gas installations. A fee of $6.86 is being charged during this summer period, for installing gas connections in two rooms of a one-story house where not more than 20 feet of pipe is used. This is payable at $2 down and $2 per month. The same installation during other months would cost $9.15 on terms. Seven connections will be made, where not more than 95 feet of pipe is used, for $31.50 compared with the regular price of $42. Approximately the same discounts are being allowed on larger homes.

Beginning with August 1st, a special sale on gas heaters will be begun with discounts averaging 10 per cent. R. E. Davis is commercial manager of the company.

GRANTS PASS PLANT ADDS SMOKE DISPOSAL ITEMS

Southern Oregon Gas Corporation is planning to introduce better facilities for smoke disposal in its plant at Grants Pass, one item being a new and higher smoke stack. Gas bain extensions in Tucson, Arizona, recently brought gas to the Santa Cruz Mission, as well as to numerous auto camps in that community, according to Max Pooler, Vice-President and General Manager of the Tucson Gas, Electric Light & Power Company. Articles of incorporation were filed with the Utah Secretary of State late in June by the Ogden Gas Company, which takes over the operations of the gas plant in Ogden, recently purchased by the Utah Gas & Coke Company from the Utah Power & Light Company. Officers of the Corporation are: E. A. Angley, president; E. M. Bagley, vice-president; Paul H. Ray, vice-president; L. C. Olpin, secretary-treasurer, and R. L. Judd, assistant secretary- treasurer.

OFFICERS' QUARTERS TO HAVE BENEFIT OF GAS HEAT

The officers occupying quarters in the Presidio of San Francisco will soon have their quarters heated by gas instead of by coal. Through the combined efforts of the Pacific Gas and Electric Company and the Electro-Gas Furnace Company, 140 of this manufacturer's floor furnaces are being installed to replace the old coal grates which have done duty for many years. Before Electro-Gas was specified, the Army officials purchased several units and operated them for two years under test and observation.

LINE FROM GONZALES BEGUN BY SOUTHWEST GAS CO.

On the 9th of July the Southwest Gas Company began construction of a gas line from the main at Gonzales, Texas, to extend to Luling and Lockhart. The line will be completed, according to report, before the winter months.

PICNIC HELD FOR EMPLOYEES OF SAN ANTONIO COMPANY

More than 2500 employees and friends of the San Antonio Public Service Company were present at the fifth annual picnic held at Camp Comal on June 30, and there partook of a Texas steer barbecue.

SMITH-EMERY OFFICERS NOW AT NEW LOCATION

Smith-Emery Company announces its removal from offices at 245 S. Los Angeles St., which have been occupied since 1910, to a new location at 920 Santee St.

PIONEER EQUIPMENT CORP.
OF AMERICA
231 Broadway
NEW YORK

USE PIONEER SEPARATORS
FOR MAXIMUM SEPARATION
EFFICIENCY UNDER ALL CONDITIONS
OF LOAD

Diagrammatic top view
of Pioneer Separator showing principle. The thin, long arrows indicate the flow of the steam, air, gas, etc. The heavy short arrows show the flow of extracted impurities. Letter A indicates catch pockets.

Install PIONEER SEPARATORS For Removal Of Crude Oil Mists From Natural Gas
Install PIONEER SEPARATORS Behind Engines, Compressors, Evaporators and Stills

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CONTRACTORS FOR COMPLETE PLANTS

High Grade Machinery

The Babcock & Wilcox water tube boilers
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Babcock & Wilcox superheaters
Hamilton compressors
Green fuel economizers
Wheeler Condenser & Engineering Co. condensing machinery
Cochrane feed water heaters (open and closed)
Cochrane feed water metering heaters
Cochrane feed water softeners (hot and cold processes)
Cochrane steam and oil separators
Cochrane flow meters
Moore automatic fuel oil regulators
Diamond soot blowers
Lagonda tube cleaners
Copes feed water regulators
Lagonda automatic boiler stop valves
Leslie reducing valves

And All Power Plant Auxiliaries

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Salt Lake City, Kearns Bldg. Honolulu, T. H. Phoenix, Heard Bldg.
Vancouver, B. C., Standard Bank Bldg.

Fire Brick Contractors
Established 1906
J. T. Thorpe & Son
Inc.
Specializing in Gas Generator, Boiler, Still and Furnace Brick, Industrial Furnaces, Retorts, Kilns, Brick Smokestacks.
A capable Engineering Department competent to advise on any problem involving firebrick construction.

San Francisco	Seattle	Portland	Los Angeles
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A WESTERN GUIDE to INDUSTRIAL PURCHASING

Readers interested in any articles not listed in these pages are cordially invited to advise *Western Gas* of their wants and every effort will be made to furnish a list of the proper manufacturers. Addresses of companies listed on these pages may be found by consulting their advertisements in this issue.

Absorption and Compression Plant Equipment
Baker Iron Works.
Chaplin-Fulton Mfg. Co.
Jensen Instrument Co.
The E. A. Key Company
Western Pipe & Steel Co.

Absorption Towers
Baker Iron Works.
Western Pipe & Steel Co.

Adjustable Plugs
Lattimer-Stevens Co.
Western Pipe & Steel Co.

Agitators
Baker Iron Works.
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Aluminum Bronze Powder for Paint
W. P. Fuller & Co.
Hill, Hubbell & Co.

Analyzers
Fort Worth Laboratories.
Smith-Emery Co.

Apparatus, Experimental Gas
The Bartlett Hayward Co.
Pacific Meter Works.

Appraisals and Valuations
Charles R. Collins.
Smith-Emery Co.

Automobile Tires
Truck Tire Service Co.

Bags, Gas Main
C. B. Babcock Co.
Mueller Co.
Safety Gas Main Stopper Co.

Barometers
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
Westcott & Greis, Inc.

Bench Iron Work
The Bartlett Hayward Co.
General Gas Light Co.

Blocks and Tiles, Fire Clay
Gladding, McBean & Co.
Stockton Fire Brick Co.

Blowers and Boosters
Ingersoll-Rand Co.
Connersville Blower Co.
The P. H. & F. M. Roots Co.

Boiler Controls
Gilfillan Machine Works, Inc.

Boiler—Brickwork
J. T. Thorpe & Son, Inc.

Boiler Equipment
E. A. Key Co.

Boiler Maker's Tools
E. A. Key Co.

Boilers, Gas-Fired
C. B. Babcock Co.
Baker Iron Works.

Boiler Settings, Pipe and Boiler Insulation
Pioneer Paper Company.
J. T. Thorpe & Son, Inc.

Boilers, Waste Heat
Baker Iron Works.
The Bartlett Hayward Co.

Boilers, Water Tube
Baker Iron Works.
Western Pipe & Steel Co.

Breakers
Ingersoll-Rand Co.

Breeching (Boiler and Stack)
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Brick, Firebrick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Brick, Firebrick—Installation
J. T. Thorpe & Son, Inc.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Buildings, Steel
Baker Iron Works.
Western Pipe & Steel Co.

Bunkers, Steel and Concrete
The Bartlett Hayward Co.
Western Pipe & Steel Co.

Burners, High Pressure
Lee B. Mettler.
Rotary Manufacturing Co.

Burners, Low Pressure
C. B. Babcock Co.
The Bartlett Hayward Co.
General Gas Light Co.
Johnson Gas Appliance Co.
Lee B. Mettler.
Payne Furnace & Supply Co.
Rotary Manufacturing Co.

Burners—Oil
Rotary Manufacturing Co.

By-product Recovery Apparatus
The Bartlett Hayward Co.

Calorimeter Accessories
Fort Worth Laboratories.
Pacific Meter Works.

Cases, Meter
Pacific Meter Works.
Pittsburgh Equitable Meter Co

Casinghead, Gas Meters
The Bristol Company
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.

Casing and Tubing (steel)
South Chester Tube Co.

Casing—Iron
South Chester Tube Company

Cast Iron Pipe
McWane Cast Iron Pipe Co.
United States Cast Iron Pipe and Foundry Co.

Castings
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Cement
Stockton Fire Brick Co.

Cement, High Temperature
Stockton Fire Brick Co.

Centrifugal Pipe
United States Cast Iron Pipe and Foundry Co.

Charging Machines (retort, etc.)
The Bartlett Hayward Co.

Checker Brick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Chemical and Gas Testing Apparatus
Fort Worth Laboratories.
Pacific Meter Works.
Stauffer Chemical Co.
Westcott & Greis, Inc.

Chemists, Analytical
Fort Worth Laboratories.
Smith-Emery Co.

Chimneys, Radial Brick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Chimneys, Radial Brick Installation
J. T. Thorpe & Son, Inc.

Chutes (coal, coke, ash)
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Clamps and Sleeves, Pipe
S. R. Dresser Mfg. Co.
Mueller Co.

Clamps, Service
Mueller Co.

Cleaners, Service
C. B. Babcock Co.
Pacific Meter Works.

Coal Gas Plants
Charles R. Collins.
The Bartlett Hayward Co.

Coal Tar Products and Chemicals
W. P. Fuller & Co.

Cocks
C. B. Babcock Co.
Johnson Gas Appliance Co.
Lattimer-Stevens Co.
Merco Nordstrom Valve Co.
Mueller Co.
Geo. D. Roper Corporation.

Collectors, Dust
Western Pipe & Steel Co.

Compressors, Air
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, High Pressure
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Compressors, Portable
Ingersoll-Rand Co.

Condensers
Baker Iron Works.
The Bartlett Hayward Co.
Ingersoll-Rand Co.

Condenser Boxes
Baker Iron Works.

Controllers
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
The Foxboro Co., Inc.
Robertshaw Thermostat Co.

Controls, Air and Steam
The Bartlett Hayward Co.
The Bristol Company
The Foxboro Co., Inc.
Jensen Instrument Co.

Cooling Systems
The Bartlett Hayward Co.

Cooling Towers
J. B. Gill Corporation.

Counters, Revolution
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.

Couplings
S. R. Dresser Mfg. Co.
The Bartlett Hayward Co.

Couplings—Flexible Rope & Spider Arm
The P. H. & F. M. Roots Co.

Coverings (Tank, Boiler, Cold and Steam Pipe)
Pioneer Paper Company.

Cubic Foot Bottle
Pacific Meter Works.

Cutters, Pavement
Ingersoll-Rand Co.

Cylinders, Compressor
The C. & G. Cooper Co.

Dephlegmaters
Western Pipe & Steel Co.

Diaphragms, Meter
Chaplin-Fulton Mfg. Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co

Diggers, Clay
Ingersoll-Rand Co.

Discharging Machines (retort, etc.)
The Bartlett Hayward Co.

Door, Clean-out
Baker Iron Works.

Drills
Ingersoll-Rand Co.
Mueller Co.

Drill Pipe—Iron
South Chester Tube Company

Drill Pipe—Steel
South Chester Tube Company

Elevators
Baker Iron Works.

Engineers and Engineering Service
Charles R. Collins.
J. B. Gill Corporation.
The Bartlett Hayward Co.
Smith-Emery Co.
Western Pipe & Steel Co.

Engines, Diesel
The C. & G. Cooper Co.

Engines, Gas
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Engines, Oil
The C. & G. Cooper Co.
Ingersoll-Rand Co.

Engines, Steam
Ingersoll-Rand Co.

Evaporating Apparatus
The Bartlett Hayward Co.
United States Cast Iron Pipe and Foundry Co.

Excavators, Ditch and Trench
The Cleveland Trencher Co.

Exchangers, Heat
Baker Iron Works.
Western Pipe & Steel Co.

Exhausters
Connersville Blower Co.
Ingersoll-Rand Co.
United States Cast Iron Pipe and Foundry Co.
The P. H. & F. M. Roots Co.

Experimental Apparatus
The Bartlett Hayward Co.
Pacific Meter Works.

Filters
United States Cast Iron Pipe and Foundry Co.

Fire Clay and Products
Gladding, McBean & Co.
Stockton Fire Brick Co.

Fire Brick Contractors
J. T. Thorpe & Son, Inc.
Stockton Fire Brick Co.

Fittings
The Bartlett Hayward Co.
McWane Cast Iron Pipe Co.
United States Cast Iron Pipe and Foundry Co.

Fixtures, Lighting (Domes, Portables, etc.)
C. B. Babcock Co.
Welsbach Company.

Fire Brick
Gladding, McBean & Co.
Stockton Fire Brick Co.

Flanges
Pittsburgh Equitable Meter Co
Westcott & Greis, Inc.

Forgings
Baker Iron Works.
Payne Furnace & Supply Co.
Geo. D. Roper Corporation.
J. T. Thorpe & Son, Inc.

Furnaces, Floor
Electrogas Furnace Co.
Magic Way Company
Payne Furnace & Supply Co.

Furnaces, Heating
Payne Furnace & Supply Co.
Magic Way Company.

Furnaces, Lead Melting
C. B. Babcock Co.
The Estate Stove Co.
Johnson Gas Appliance Co.
Mueller Co.
Payne Furnace & Supply Co.

Gas Analysis Apparatus
The Foxboro Co., Inc.
Fort Worth Laboratories.
Jensen Instrument Co
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Gas Masks
Safety Gas Main Stopper Co.

Gas Main Tapping & Drilling Machines
Mueller Co.

Gaskets
The E. A. Key Company
Pittsburgh Equitable Meter Co
Safety Gas Main Stopper Co.
Southwestern Pipe Joint and Engineering Co.

Gasket Compound
W. P. Fuller & Co.
E. A. Key Co.

Gas Pipe Line Construction
Western Pipe & Steel Co.

Gates—Wind & Blast
The P. H. & F. M. Roots Co.

Gauges
The Bristol Company
Fort Worth Laboratories.
The Foxboro Co., Inc.
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Westcott & Greis, Inc.

Gauges, Steam
The Bristol Company
Jensen Instrument Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Gauges, U Type
C. B. Babcock Co.
The Bristol Company
Fort Worth Laboratories.
Jensen Instrument Co.
Lee B. Mettler.
Pacific Meter Works.
Safety Gas Main Stopper Co.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

Generators, Water Gas
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Reynolds Gas Regulator Co.
Sprague Meter Co.
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Hanger, Meter
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Hangers, Iron and Steel
Baker Iron Works.

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Baker Iron Works.
The Estate Stove Co.
General Gas Light Co.
Magic Way Company.
Payne Furnace & Supply Co.
Welsbach Company.

Heaters, Floor
General Gas Light Co.
Magic Way Company.
Payne Furnace & Supply Co.

Heaters, Wall
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General Gas Light Co.
Magic Way Company.
Payne Furnace & Supply Co.

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Western Pipe & Steel Co.

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Western Pipe & Steel Co.

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Ingersoll-Rand Co.

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Baker Iron Works.

Holders, High Pressure
Baker Iron Works.
Western Pipe & Steel Co.

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Hose, Air
Ingersoll-Rand Co.

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Jensen Instrument Co.
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Baker Iron Works.
J. T. Thorpe & Son, Inc.
Western Pipe & Steel Co.

Incinerator Brickwork
J. T. Thorpe & Son, Inc.

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Westcott & Greis, Inc.

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Fort Worth Laboratories.
Jensen Instrument Co.
Pacific Meter Works.
The Foxboro Co., Inc.
Westcott & Greis, Inc.

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MORE COMMERCIAL USERS FOR PORTLAND COMPANY

Several industrial applications of gas recently made on the lines of the Portland Gas & Coke Company hold considerable interest.

A real estate subdivision headquarters, selling by the "luncheon-lecture" system, has added a gas range and water heater to prepare their luncheons.

Bradley Pie Company has ordered a 16-foot rotary oven, equipped with thermostatically controlled gas burners, to meet the increasing demand for a new style of pie. At present the company bakes with an electrically heated oven.

A five horse power gas-fired boiler has been installed by a creamry to heat pasteurizing and sterilizing equipment.

Gas burners are being installed in the oat drying machine at the Sperry Flour Company. Fans and ducts recirculating will also be installed. This machine will consume several hundred thousand cubic feet of gas per month. Coke has been used.

Gas is being used in several stands at Hayden Island Park, Portland's newest amusement place. The most interesting use is in the bath house where a machine supplies heated air for hair drying. Twelve women can be accommodated at a time.

SEES SAVINGS POSSIBLE FROM GAS USE AT POWER PLANT

In a report to the city council of Austin, Texas, Walter E. Seaholm, electrical superintendent of the city, stated that an annual saving of between $15,000 and $18,000 would result from the use of natural gas at the city power plant instead of lignite, which is now used.

GASOLINE ASSOCIATION WILL DISCUSS PLANT CONTROL

"Practical Plant Control by Use of Gas and Gasoline Analysis" is the subject of a paper to be read by J. C. Burke of the O. C. Field Gasoline Corporation before the August 9 meeting of the California Natural Gasoline Association. The meeting will be held at the Alexandria Hotel, Los Angeles.

PUEBLO CHANGE OVER CALLS FOR MUCH APPLIANCE WORK

In the course of adapting its system to the use of natural gas from the Texas-Denver line, the Pueblo Gas & Fuel Company, Pueblo, Colo., is changing over 20,000 appliances and 100,000 orifices, according to A. N. Talbot, general manager of the company.

SURVEY FOR GAS IN McCAMEY BY WEST TEXAS GAS CO.

A gas survey has been made in McCamey, Texas, by the West Texas Gas Company with a view to extending the gas line which is now being constructed from Amarillo to Midland, on to McCamey. It is estimated that gas will be served the city by January 1st.

TEMPORARY ABSORPTION PLANT ERECTED IN POTRERO FIELDS

A temporary absorption plant has been erected on the Associated Oil Company's Cypress No. 2 Lease in the Potrero fields by the Standard Gasoline Company.

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Western Pipe & Steel Co.

Kilns—Brickwork
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Welsbach Company.

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South Chester Tube Company

Line Pipe—Steel
South Chester Tube Company

Linings—Brickwork
J. T. Thorpe & Son, Inc.

Linings—Car
Pioneer Paper Company.

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Mueller Co.
Safety Gas Main Stopper Co.

Mains, Street
United States Cast Iron Pipe and Foundry Co.

Main, Stopper
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Mueller Co.
Safety Gas Main Stopper Co.

Mantles, Gas Lighting
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General Gas Light Co.
Welsbach Company.

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Jensen Instrument Co.
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Westcott & Greis, Inc.

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Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.
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Meters, Consumers
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Pittsburgh Equitable Meter Co
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Westcott & Greis, Inc.

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Jensen Instrument Co.
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Meters, High Pressure Distribution
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Jensen Instrument Co.
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Meters, High Pressure Iron Case
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Pacific Meter Works.
Pittsburgh Equitable Meter Co
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Meters, Industrial Consumers
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Connersville Blower Co.
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Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.
The Foxboro Co., Inc.
The P. H. & F. M. Roots Co.

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Pittsburgh Equitable Meter Co
Sprague Meter Co.

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Pittsburgh Equitable Meter Co
Sprague Meter Co.
Westcott & Greis, Inc.

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Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.
The P. H. & F. M. Roots Co.
Westcott & Greis, Inc.

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Jensen Instrument Co.
Pittsburgh Equitable Meter Co
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The P. H. & F. M. Roots Co.
Westcott & Greis, Inc.

Meters, Orifice
Jensen Instrument Co.
Pacific Meter Works.
Pittsburgh Equitable Meter Co
The Foxboro Co., Inc.
Robinson Orifice Fitting Co.
Westcott & Greis, Inc.

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Pittsburgh Equitable Meter Co
Sprague Meter Co.

Meters, Oxygen and Hydrogen
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Sprague Meter Co.

Meters, Prepayment
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Pittsburgh Equitable Meter Co
Sprague Meter Co.

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Meter Shelves
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Meter Swivels and Caps
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The Bartlett Hayward Co.
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Pittsburgh Equitable Meter Co
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The Bristol Company
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The Foxboro Co., Inc.
Westcott & Greis, Inc.

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Fort Worth Laboratories
Pacific Meter Works.
Pittsburgh Equitable Meter Co
Sprague Meter Co.
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Pittsburgh Equitable Meter Co
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Geo. D. Roper Corporation.

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Pioneer Paper Company.

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South Chester Tube Company

Pipe—Steel
South Chester Tube Company

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Pipe Jointers
Mueller Co.

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Geo. D. Roper Corporation.
Tappan Stove Co.

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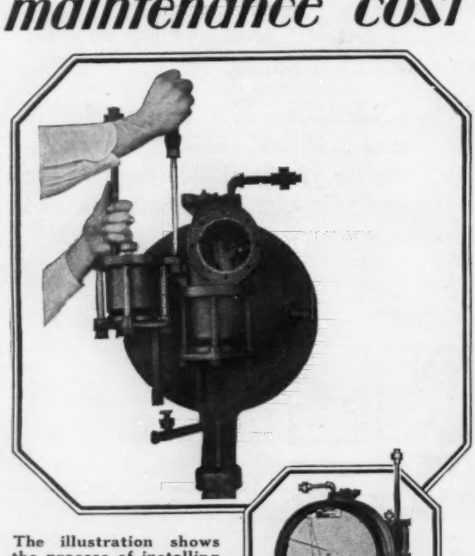

The illustration shows the process of installing a 50" low pressure mercury chamber in place of a 100" chamber.

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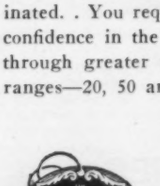
The new Foxboro Orifice Meter is easy to clean, quick to assemble, low in maintenance cost. It is the most powerful float type orifice meter on the market. It has a uniform scale chart and uniform pen travel. Inherent error is eliminated. . You require less frequent checking. You soon have confidence in the Foxboro Orifice Meter to perform reliably through greater periods of time. Made in three standard ranges—20, 50 and 100 inches of water.



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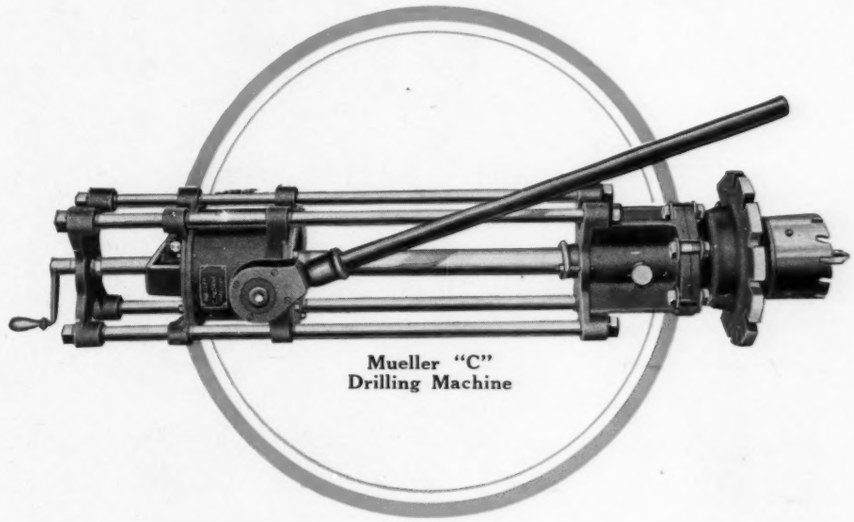

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Quick - Efficient - Easy

for making lateral or branch connections to gas mains

Stripped of every pound of metal that can be spared without reducing the wearing qualities—the Mueller "C" Drilling Machine can easily be handled by two men without straining, and one man can operate it if necessary. Scientifically designed to handle heavy duty work, the Mueller quality that is a part of this machine, as it is of **every** Mueller product, assures faithful service and lasting satisfaction.

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MUELLER CO.

(Established 1857)

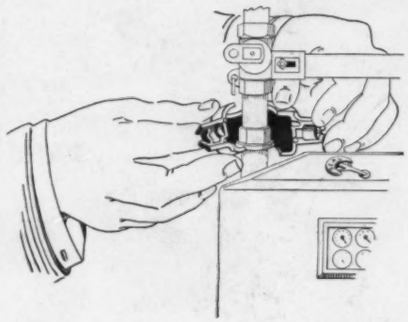
San Francisco: 1072-76 Howard St. **2468 Hunter St., Los Angeles**

Dallas: 901 McKinney Ave.

Factory: Decatur, Illinois

Canadian Factory: MUELLER, Limited Sarnia

MUELLER



L-S
Stopcock and Union Seals

Lattimer-Stevens stopcock and union seals when placed around a flathead stopcock or union, prevent tampering.

The anchor seal is locked by the small anchor of spring variety. When the seal is to be removed the inexpensive anchor is broken without injuring the clamp. By using a new anchor, the same clamp may be reused many times.

The padlock type can be sealed with either our special padlock or the ordinary lead and wire seal. The special padlock is also of the spring variety and must be broken to be removed from the seal.

Both stopcock and union seals can be furnished in either the anchor or padlock types. The union seals are furnished in all sizes from 5-light to 100-light and stopcock seals in sizes from ¾" to 2".

Lattimer Stevens
METER CONNECTIONS-SHELVES
STOP COCKS AND SEALS

Columbus, Ohio

New England Representative
The Eastern Service Company
250 Stuart St., Boston, Mass.

Chicago Representative
The Utilities Service Co.
122 S. Michigan Ave.

San Francisco Representative
A. P. Bartley
163 Second St.